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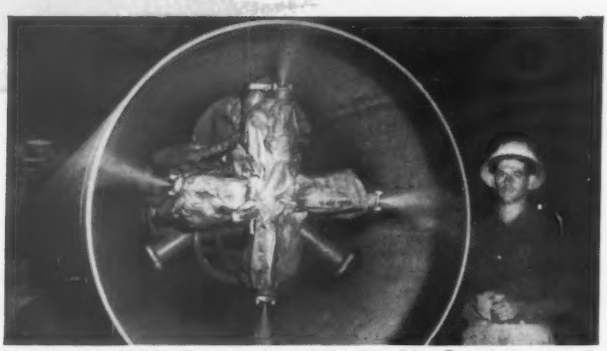

36" pipe to be laid by Transcontinental Gas Pipe Line Corp. being coated with *Copon*, containing Epon resin. *Copon* is manufactured by Coast Paint and Lacquer Co., Houston.

Stock of 36" pipe, lined with Epon resin coating, to be used by Transco.

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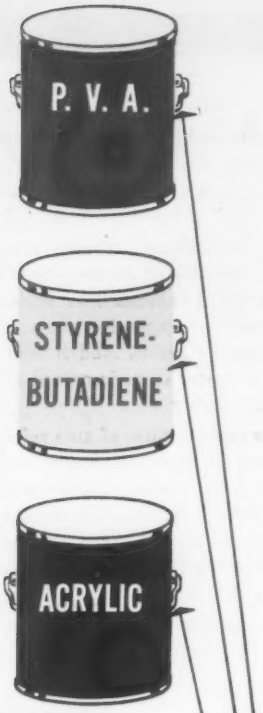

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PAINT and VARNISH Production

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Formerly PAINT and VARNISH PRODUCTION MANAGER

(Established in 1910 as The Paint and Varnish Record)

VOL. 46 JANUARY, 1956 NO. 1

NEXT ISSUE

Next month we will feature an informative article on the effect of gamma radiation on the stress-strain properties of unpigmented soya alkyd resin wet films. Experimental data and a discussion of gamma irradiation will be included.

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1956-A Possible 2 Billion Dollar Volume

IT HAS often been said that as the steel industry goes so goes the nation.

As our economists assess the health of the nation's economy for 1956, they must consider the expansion program which the steel industry has on tap. 1956 outlays for the steel industry is expected to reach $1.5 billion, which will be earmarked for new ingot capacity and rolling stock. Demands made upon the steel industry during recent months have been particularly heavy. New orders are outrunning shipments and unfilled orders are still mounting—all of which point up the ambitious plans envisioned by American industry during 1956.

According to a recent survey by Securities and Exchange Commisison and the Department of Commerce, plant and equipment expenditures will rise to a $31.6 billion annual rate in the first quarter of 1956. Expenditures for the last quarter of 1955 have been placed at a $30.8 billion rate. The annual rate of expenditures planned for the coming quarter is 25% higher than actual outlays in the first quarter of 1955 and this also represents 12% above the 1955 full-year average with the railroads and manufacturing industries showing the largest relative increase. This survey further states that manufacturers plan to step up their plant and equipment outlays to a $13.4 billion annual rate in the coming quarter which is considered 33% higher compared to the same period of 1955 and some $800 million above the total expected during the last quarter of 1955.

For example, the chemical industry, fourth among America's industry in size, is expected to continue its expansion of plants and facilities at a high level during the coming months. Based on preliminary estimates, total investment in plant facilities for the chemical industry will again top the $1 billion mark for the fifth consecutive year.

Another bright spot in our national economy is the outlook for construction which is gunning for a record-breaking total of $44 billion in 1956, 5% above the $42 billion peak expected in 1955. However, housing will be down some 100,000 units below 1955 due to a tight money policy by the government. But the rising volume of industrial, commercial, and public utility construction scheduled for this year will more than offset this anticipated dip in residential building.

Since construction accounts for well over 16% of all our economic activity, the anticipated high level in this field alone will contribute materially to the nation's economic well being.

In the automobile field, 1956 is not expected to match the last year's spectacular record which produced a volume close to 8 million passenger cars and over 1¼ million trucks. Tightening of consumer credit and the present period of adjustment in the car market are responsible for the expected slack in this field. However, many leaders are hopeful for a volume of seven million units for the coming year, but realize that harder selling is the only means by which this volume can be attained.

Predictions of some of the nation's leading economists are that 1956 will get off to a strong start and may be the most active year in the country's history. Total national output is expected to reach $400 billion during this year. Defense spending has been set for $34.5 billion for 1956, which was roughly the same for 1955.

In fact Sec. of Commerce Sinclair Weeks feels very confident that the first six months of next year at least business will move to a higher plane following the establishment of a new record for 1955.

The paint industry which is seeking a new all-time record in 1955 is certain to top a sales volume of $1.5 billion. The continued boom in our national economy will mean unprecedented levels of high activity in all segments of the paint industry during the months ahead—making a $2 billion dollar goal a possibility for 1956.

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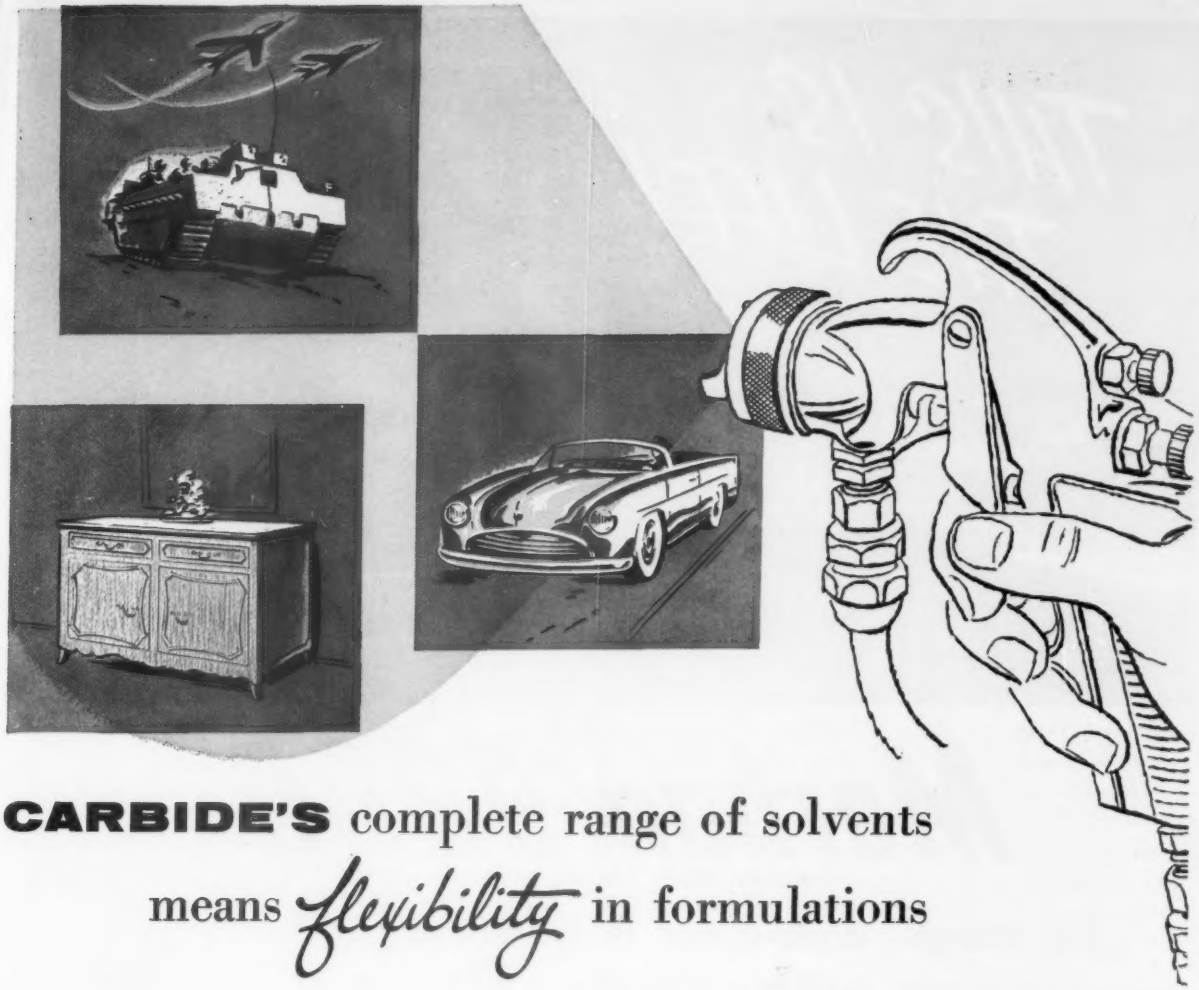

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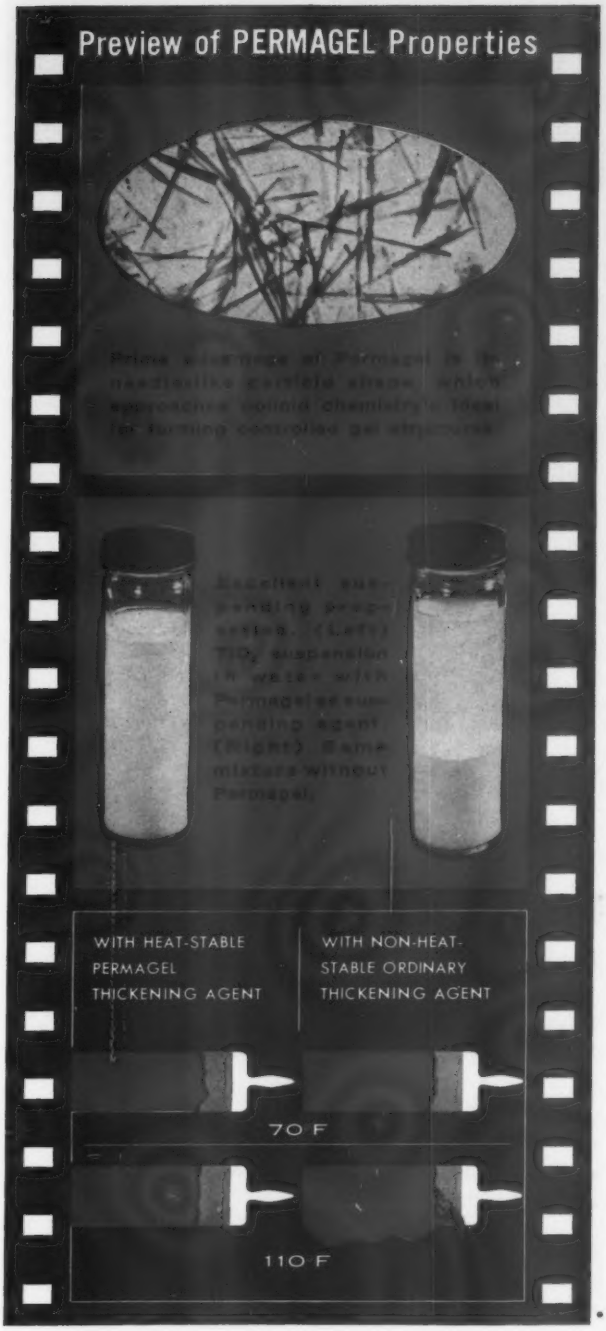

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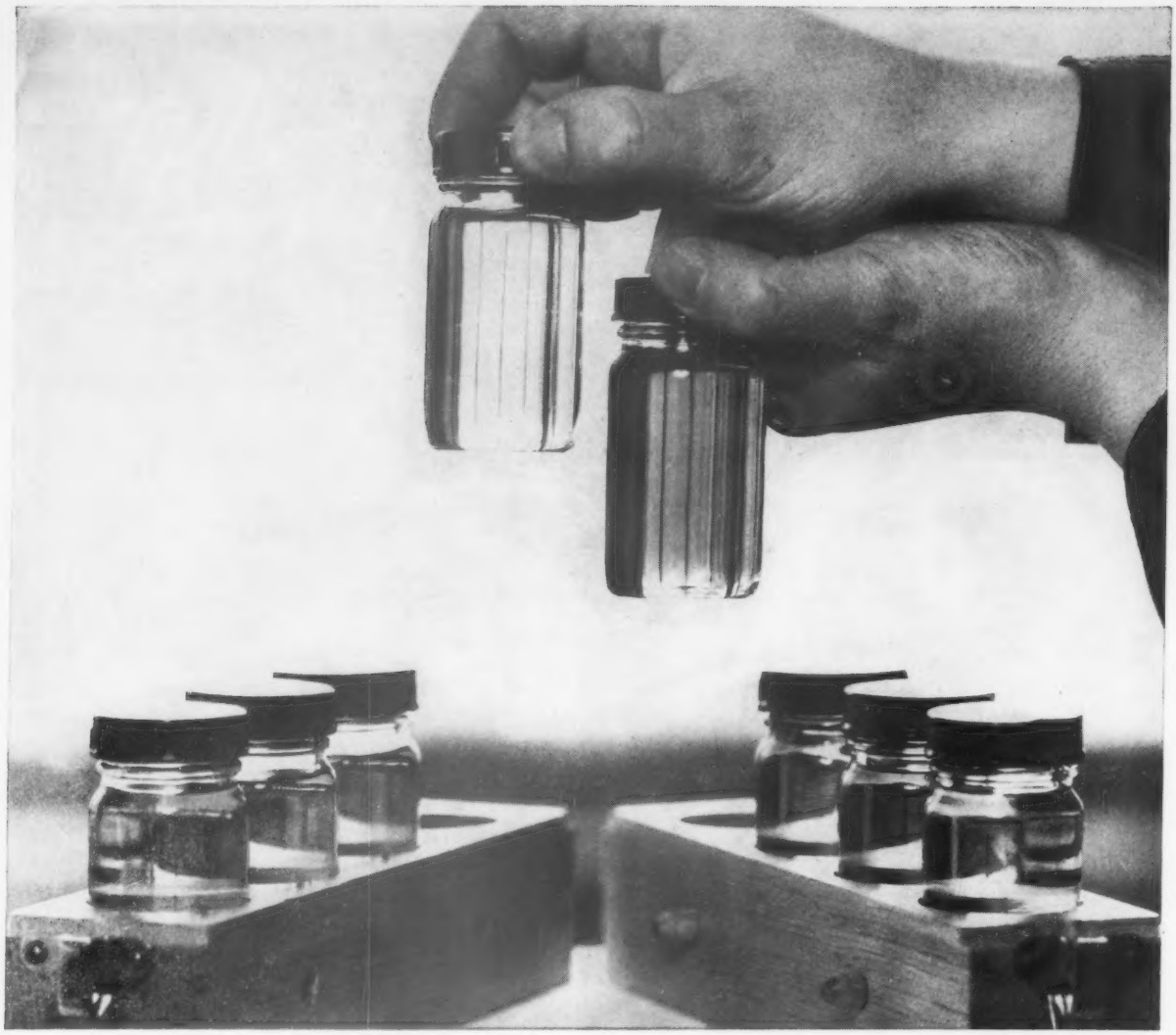

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Now you can see for yourself what this can mean to you in your own alkyd preparations. This demonstration kit wraps the whole story into one package. By visual comparison you can quickly appreciate how Hercules Improved Technical PE gives the desirable pale colors of mono-PE, plus the processing advantages of technical PE.

Here is another step forward in alkyd manufacture—a technical PE that is literally a "chemical constant."

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HERCULES POWDER COMPANY
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SP56-1

The solution of a technical problem in industry demands expert attention. In this picture Spencer Kellogg and Sons presents two experts who serve its eastern group of customers, Herb Bayer, Manager of the New York Office, and Dick Nagel, Eastern Division Manager of Spencer Kellogg Technical Service.

In his years of experience Mr. Nagel has conducted thousands of useful experiments in the formulation of protective coatings . . . in the laboratory, in the pilot plant and with full scale equipment.

Equally expert, drawn from as much experience and as valuable to Spencer Kellogg customers, is Mr. Bayer's business knowledge. He has, thru many seasons, watched the market movements in paint, varnish and lacquer materials and observed the development and progress of hundreds of products in this field.

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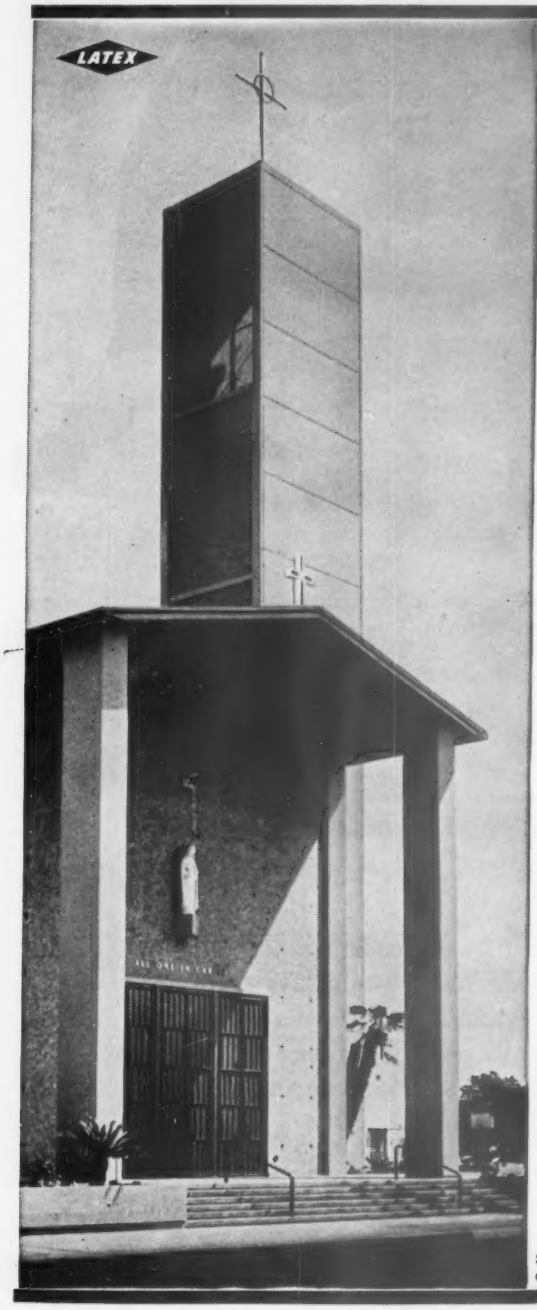


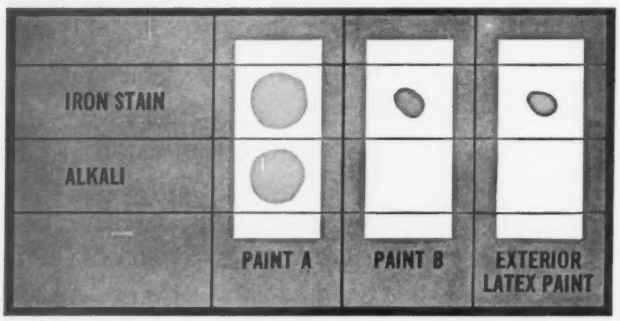
They're highly resistant to alkali and staining, have excellent package stability, won't yellow or retain dirt. And we can back our statements by actual tests.

We've read a lot of claims about various exterior masonry paints, lately. You probably have, too. But, what we have to say about a good exterior masonry latex paint, we can prove.

Laboratory and field tests show that Dow Latex 512-K (STYRENE-BUTADIENE) makes durable masonry paints that won't mildew, yellow with time or retain dirt. When they do fail, as *all* paints do, they chalk gradually and repainting is easy. Paints that blister and peel with age make repainting difficult. You can prove their superior resistance to alkali and water with the test shown below.

We have yet to hear of an exterior latex paint made with Dow Latex that wasn't stable in packaged form. We haven't had any problems of settling, rusting, color loss and spoiling. As for quick drying, lack of painty odor, ease of application, fast equipment clean-up, exterior latex paints are unbeatable.

When you buy or make an exterior paint, look at all the facts. You'll agree with progressive manufacturers and users—latex paint is *best*, by actual test. For further information on exterior latex paints, write for the booklet "Dow Latex 512-K for Exterior Latex Paints." THE DOW CHEMICAL COMPANY, Midland, Michigan, Plastics Sales Department PL 523R.



PAINT THREE DIFFERENT PANELS with an exterior latex paint and two other typical exterior paints. Put a few drops of iron oxide in water and 5% sodium hydroxide (an alkali) on each. In twenty minutes, try scraping the paints where these reagents have been on them. You'll find the latex paint has stood up much better than the other exterior paints.

St. Brigids Church, winner of Award of Merit, A.I.A. 1955 Nat'l Convention. Architect, Choix and Johnson, A.I.A., Los Angeles, Calif. Painting Contractor—J. P. Carroll, Los Angeles, Calif.

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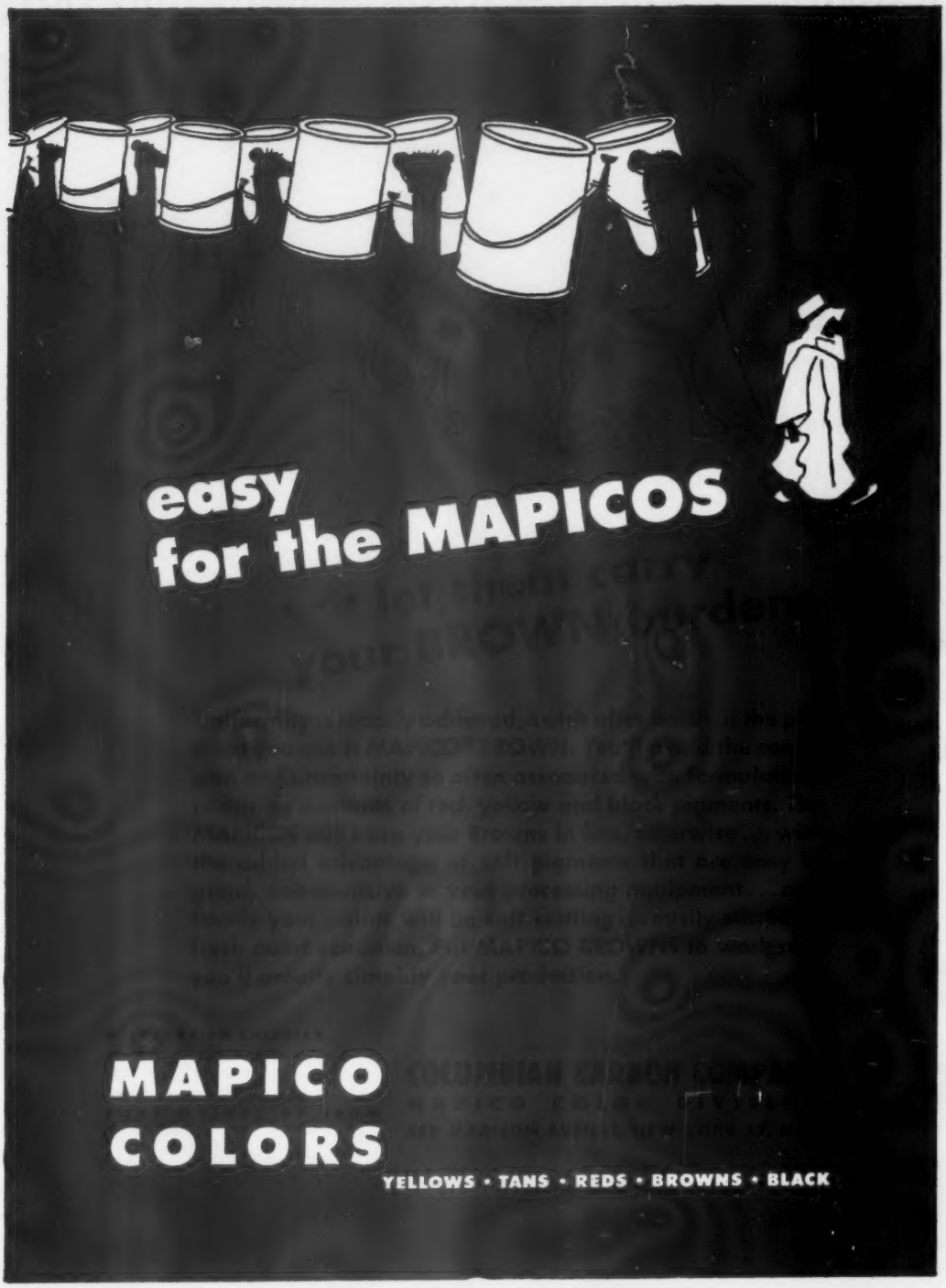
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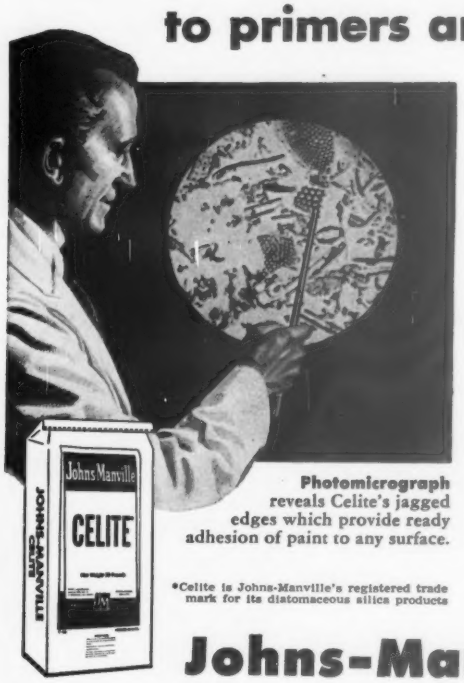

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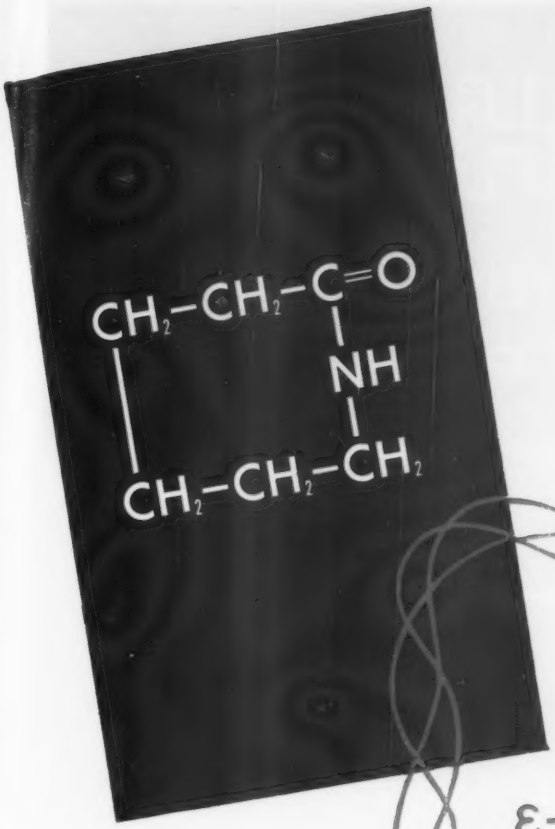

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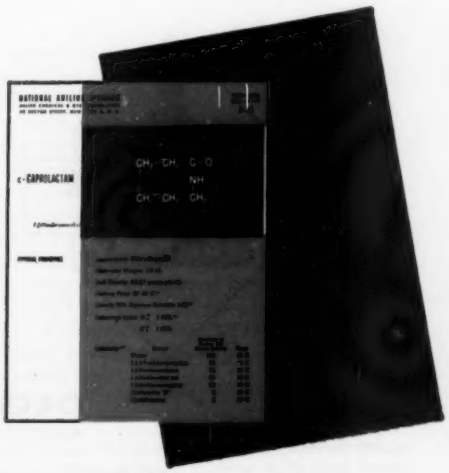

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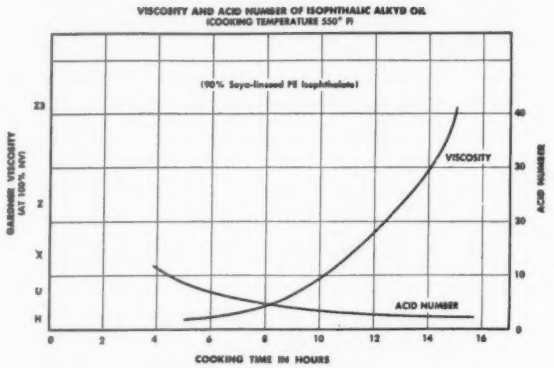

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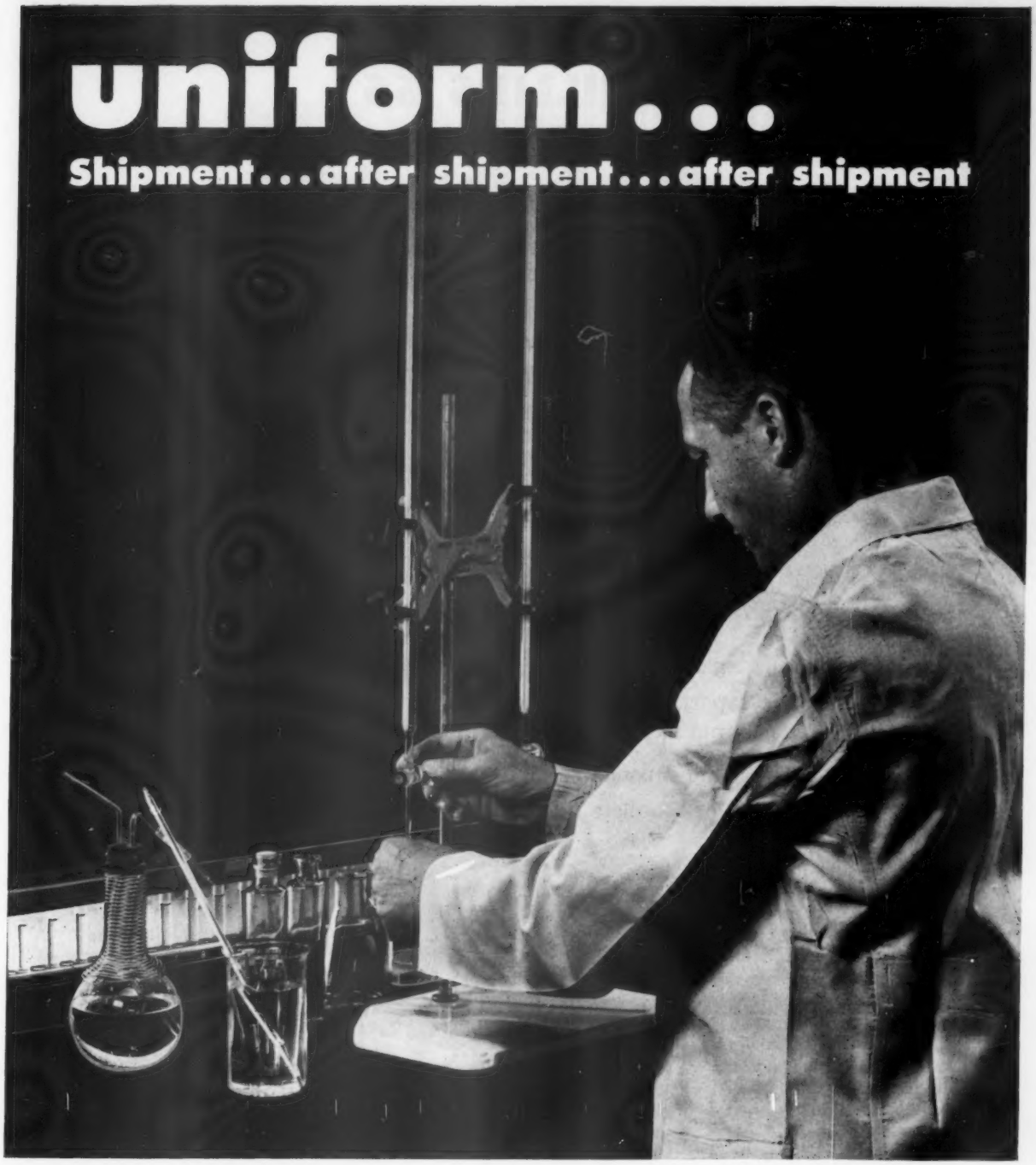

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AN EVALUATION OF ORGANIC COATINGS FOR USE IN CATHODICALLY PROTECTED DOMESTIC HOT-WATER TANKS

By

B. G. Brand G. A. Hudson*

F. W. Fink E. R. Mueller

Battelle Memorial Institute

DURING the past few years the use of cathodic protection to mitigate the corrosion of ferrous structures has greatly increased. Among the items which are cathodically protected are domestic hot-water tanks, pipelines, offshore drilling equipment, ships and communication equipment. The cost of maintaining these structures by cathodic protection is dependent upon the amount of metal exposed to a conductive environment. An organic coating which would electrically insulate a large portion of the metal surface from its environment would greatly decrease the cost of maintaining the structures by cathodic protection.

A research program was carried out at *Battelle Memorial Institute* to determine the possibility of using organic coatings on the interiors of domestic hot-water tanks cathodically protected with magnesium anodes. The results of this research have helped to define more clearly the properties required of organic coatings used on cathodically protected surfaces, and has led to the development of tests which are of value in evaluating coating systems proposed for use with cathodic protection. These tests and the results are described in this paper.

Corrosion and Cathodic Protection

It is well known that corrosion is electrochemical, i.e. electric currents pass from an electrode through the electrolyte and back to a second electrode in electrical connection with the first. Electrons from the metal are known to react with material in solution; meta ions pass into solution at the *anode*, and negative ions in solution release electrons to the metal at the *cathode*. Anodic and cathodic areas may occur on the same metal surface as a result of slight dissimiliarities in the metal's composition or in the environment. The anodic current may be reduced or eliminated by the application of a suitable emf from an outside source. The amount of this so-called cathodic protection which is applied in practice to reduce the natural tendency for corrosion, depends partly on the economic factors in the particular situation. Normally it does not pay to eliminate the corrosion attack entirely, so only a sufficient current to obtain a low value for the corrosion rate is used.

The current may be supplied by two different methods. In one method, the metal to be protected

*Present Address—Mobay Chemical Company, Anniston, Alabama

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Table 1. Thermal shock[1] and alkali-resistance[2] of coatings

Type of Coating	Modifying Resins	Pigment	Thermal Shock: Condition After 800 Hours in Test (1200 Cycles)	Alkali Resistance: Condition After 200 Hours	Alkali Resistance: Remarks
Epoxy	Phenolic	–	Excellent	Scattered No. 8 blisters, 140 hours to first blister	Excellent alkali resistance
Epoxy	Phenolic	TiO_2 (10 per cent by volume)	Excellent	Scattered No. 8 blisters	Excellent alkali resistance
Vinyl chloride (laminate coating)	–	–	Excellent	Excellent	Excellent alkali resistance
Blown asphalt	–	–	Excellent	Appears to have become slightly embrittled	Good alkali resistance
Epoxy ester	–	–	Excellent	Coating slowly attacked by alkali	Good alkali resistance
Butadiene styrene	–	–	Poor, many blisters	Large number of No. 8 blisters	Fair alkali resistance
Epoxy ester	–	Aluminum (10 per cent by volume)	Excellent	Completely destroyed	Poor alkali resistance
Phenolic	–	–	Excellent	Completely destroyed	Poor alkali resistance

Notes: All coatings evaluated at 1.0 mil film thickness with following exceptions: vinyl chloride at 2.0 mils, blown asphalt at 10-15 mils. Blistering is represented by numbers in accordance with ASTM Specifications 0714-45 PT. 11, 1946 Standards, page 1171. Blisters represented within scale 0 to 10, in which 0 represents the presence of very large blisters and 10 represents no blistering.

(1) Alternate 20-minute immersions in water baths held at 35 and 190 F.
(2) Immersion in 0.2N NaOH at 180 F.

is coupled to a metal high in the electromotive series, such as magnesium. Current flows through the electrolyte from the magnesium to the iron, the latter metal is protected and the magnesium is sacrificed in the process. In the second method, the protected metal is connected to the negative terminal of a voltage source and the circuit is completed by coupling to either inert anodes such as graphite or to sacrificial anodes such as scrap iron.

A coating on the interior of a hot-water tank protected by a magnesium anode would be subjected to tap water whose temperature could range from 35 to 180 F or higher, and to the electrochemical effects associated with cathodic protection. In addition to the presence of alkali and hydrogen formed at the cathodic surface, such a coating would be subjected to an accelerated penetration by water moving under the influence of the 0.6 - 0.8 volt developed between magnesium and iron. This transport of water through a film is the phenomenon of electro-osmosis, and occurs because of the tendency of water to become positively charged and to be attracted to cathodic areas. In one investigation [1] it was shown that in the blistering of organic coatings by both osmotic and electro-osmotic forces, 90 per cent of the water in the blisters was transferred by electro-osmosis.

The current density[2] required to protect a domestic hot-water tank is about 2-4 ma/sq. ft. This current density differs from the 8-11 ma/sq. ft. generally accepted as the current density required to protect steel in dilute aqueous solutions[3]. The lower current density required for the hot-water tanks is attributed to the lessened effect of oxygen in the hot-water tank as a result of the temperature and the enclosed nature of the system.

Selection of Coatings

In planning the test work, it was thought advisable to evaluate a selection of coatings that would permit characterization of both satisfactory and unsatisfactory materials for this application. In addition, there would be a possibility of correlating the results obtained on different coatings from test to test, and to determine more accurately the requirements of organic coating systems in this application. The coating systems evaluated in this work included:

1. Butadiene-Styrene
2. Blown Asphalt
3. Epoxy ester
4. Epoxy ester (pigmented with leafing aluminum)
5. Epoxy-phenolic
6. Epoxy-phenolic (pigmented with TiO_2)
7. Phenolic
8. Polyvinyl chloride (a laminate coating applied to steel with an adhesive)

All the coatings selected for evaluation were known to have good resistance to hot water. The epoxy ester coating was pigmented with aluminum in order to have an alkali-sensitive coating included in the selection.

Laboratory Tests

Five different tests were used in this work. These were designed to subject coatings to conditions of exposure that could be expected in use. The coatings were evaluated for their resistance to: (a) thermal changes between 35 and 190 F, (b) a 0.2N sodium hydroxide solution at 180 F, and (c) cathodic environments. The tests and the results obtained on coatings in each test are described in the following sections:

Thermal-Shock Test

A thermal-shock test was designed for the purpose of evaluating coatings in a thermal environment characteristic of the extreme conditions of exposure that might be found in service. In this test, coated panels were positioned on a gear-driven lever which alternately immersed the panels into water baths held at 35 and 190 F. The immersion time at each temperature was 20 minutes. The action of the lever was controlled by two cynchronous motors and by two limit switches. The immersion times were controlled by a gear-driven timer.

Coatings were evaluated in the thermal-shock test for 800 hours

(1200 immersion cycles). During the test period the coatings were checked for signs of deterioration such as discoloration, cracking, blistering, or disintegration. The poorest performance in the thermal-shock test was given by the butadiene styrene coating. This material blistered badly. All the other coatings were in excellent condition. It was thought that failure due to thermal shock might cause the coatings to crack, but no such failure occurred. (See Table 1).

Alkali-Resistance Test

In the alkali-resistance test, the coatings were subjected to a 0.2N sodium hydroxide solution maintained at 180 F. Based on the observations of other workers[4], it was thought that this concentration of alkali would be representative of alkaline solutions that would be developed under coating blisters on a cathodically protected substrate.

Coatings were subjected to the alkali-resistance test for 200 hours before they were evaluated. The phenolic coating and the epoxy ester coating pigmented with aluminum had poor resistance to the alkali. These coatings were completely destroyed after 200 hours in test. The unpigmented epoxy ester coating was slowly attacked by the alkali, but was judged to possess good alkali resistance. Although the blown asphalt coating appeared to be somewhat embrittled by the alkali, it was also rated as having good alkali resistance. The butadiene-styrene system blistered quite severely and was rated as having fair alkali resistance. Excellent performances were given by the epoxy-phenolic coatings and by the vinyl chloride laminate. (See Table 1).

Applied-Potential Test

In order to study the effects of a cathodic environment on coatings under conditions more severe than those characteristic of a domestic hot-water tank protected with magnesium anodes, an applied potential test was developed (Figure 1). In this test, coatings were applied to both sides of 2-inch by 5-inch, 16-gage mild-steel test panels which had a 2½ inch by ½-inch handle. These coated panels were positioned between 8-inch by 4½-inch by ¼ inch graphite plates. Twelve panels and thirteen graphite plates were secured in brass lugs, which were spaced along a phenolic board. This board was mounted on a 28-inch by 12-inch by 8-inch glass aquarium tank filled with a sodium chloride solution adjusted to a resistance of 1,000 ohm-cm. The coated panels and the graphite plates were immersed in the salt solution which was maintained at 180 F. The coated panels were connected to the negative terminal of a voltage supply and the graphite plates were connected to the positive terminal.

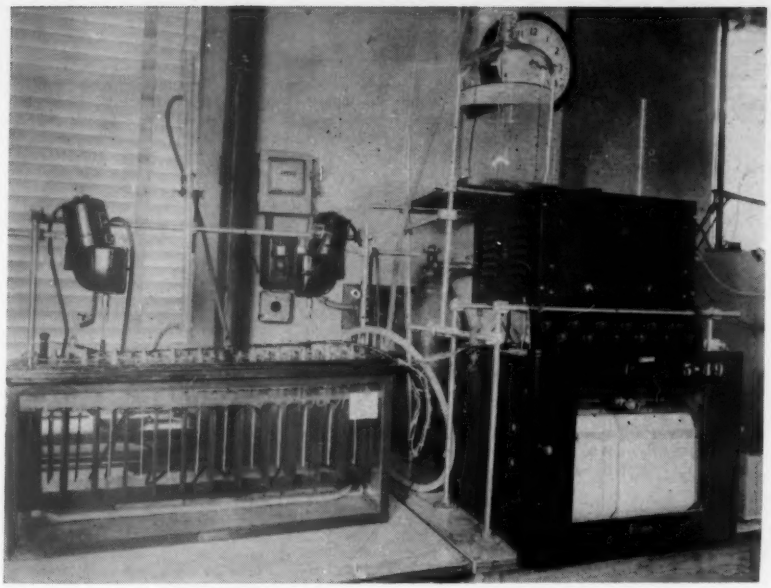

Figure 1. Applied potential apparatus

An applied potential of 2.5 volts was used in all the evaluations made with this apparatus. This voltage is over three times the 0.6 to 0.8 volt developed in a magnesium-protected iron tank. The use of the higher voltage in the 1,000 ohm-cm electrolyte was expected to greatly accelerate any tendency for a coating to fail as a result of the effects of cathodic protection.

A twelve-point Brown recorder was used with the apparatus to keep a continuous record of the current flow to each panel. This was done since it was thought that at the start of coating failure there would be a sharp increase in current flow to panels with the failing coatings. The results obtained on coatings evaluated in the applied-potential apparatus depended largely upon the alkali resistance of the coatings.

Coatings which were found to have poor alkali resistance in the alkali immersion test previously described, failed quickly in the applied-potential apparatus under the attack of cathodically produced alkali. The attack of alkali caused a continual increase in the amount of current flowing to the test panels involved as more of the panels' metal was exposed.

Table 2 shows the results obtained in the applied-potential apparatus on coatings having varying degrees of alkali resistance. These results show that the phenolic coating and the epoxy ester coating pigmented with aluminum were quickly and progressively destroyed by cathodically produced alkali. The epoxy ester coating pigmented with aluminum drew very little current at the start of the test. However, once the coating was penetrated by water and by solute ions, it was quickly destroyed by cathodic alkali. The destruction of the coatings having poor alkali resistance appeared to be linear with time over an eight-day period. (See Figure 2).

The unpigmented epoxy ester coating which was shown to be comparatively alkali resistant was more slowly destroyed in the ap-

Type of Coating	Modifying Resins	Pigments	Apparent Current Density, ma/sq ft			Remarks on Performance		
			24 hr	72 hr	192 hr	24 hr	72 hr	192 hr
Epoxy	Phenolic	–	0.8		4.2	A few No. 8 blisters formed at handle	Blisters at handle growing larger, many No. 9 blisters on one-coat side	Two-coat side has few No. 9 blisters, slightly larger blisters near handle. One-coat side had more and larger blisters
Epoxy	Phenolic	TiO_2 10 per cent by volume	8.5	3.4	3.0	No change	A few No. 8 blisters on two-coat side near handle. A few more and larger blisters on one-coat side	No. 8 blisters near handle and scattered No. 8- No. 9 blisters over panel. One-coat side has more and larger blisters
Epoxy ester	–	–	3.0	8.5	12.0	No change	After 48 hours blisters formed near handle, grew larger and extended down panel	Most of panel blistered No. 3 – No. 4 blisters
Epoxy ester	–	Aluminum 10 per cent by volume	1.8	2.6	195.0	A few No. 9 blisters near handle	Blisters at handle increasing in size and in number. More blisters forming on panel	Coating almost completely destroyed
Phenolic	–	–	8.5	51.0	127.0	No change	Gassing and discoloration at handle area, and at bottom of panel	Most of one-coat side destroyed. Two-coat side in better condition

Notes: Bare panel current density - 297 ma/sq ft One-coat side - 0.75 mil Two-coat side - 1.75 mils

Table 2. Applied potential test results

plied-potential test. (See Figure 3).

Coatings giving the best performances in the applied-potential test were those based on epoxy-phenolic resin combinations. These coatings performed well in restricting current flow (See Figure 2), and they were not destroyed by cathodic alkali. The blistering of these coatings, due to the transport of water and solute ions through the films, did not seem to affect their ability to control the protective current flow. The blisters formed with the alkali-resistant coatings were always filled with a liquid whose pH was at least 12. No corrosion was ever noted under these blisters. The production of cathodic hydrogen did not seem to harm the coatings. Any hydrogen formed under the coatings probably diffused through the coating and was discharged into the electrolyte.

The vinyl chloride laminate and the blown asphalt coatings were highly resistant to the applied-potential test conditions. However, these coatings quickly lost adhesion to their panels once they were penetrated by liquid. This undercutting was greatly accelerated when the coatings were damaged. Because of the tendency to lose adhesion, the vinyl chloride and the asphalt coatings were judged to be unsatisfactory in this work, along with those materials characterized as having poor alkali resistance.

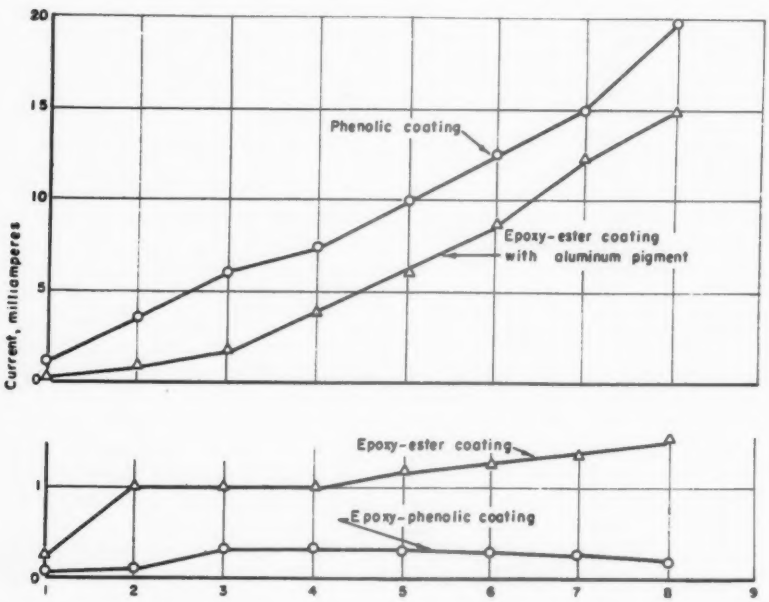

Figure 2. Current versus time in applied potential test

In the case of all the materials tested in the applied-potential apparatus, it was found that coating deterioration was most severe at corners of panels, along edges, and around scribes, or thin spots in the coatings. These are areas at which cathodic currents tend to concentrate.

The destructive effects of water transport through the coatings along the edges were minimized by masking the panels with a vinyl tape.

The applied-potential test showed that the chief requirement of a coating for use with cathodic protection is a high degree of alkali resistance, and that it is possible to minimize the transport of water through the coatings under the influence of electro-osmosis by eliminating points at which the cathodic currents tend to concentrate. It was also shown that the magnitude of electrical current flowing to a panel coated with an alkali resistant material cannot be used as a criterion of the behavior of the coating, since coatings in poor condition gave both high and low current values. Even though a film is excessively blistered, current values are kept at a low value unless the blisters become ruptured.

Alkali-Resistance of the Phenolic Coating

In order to learn how sensitive the phenolic coating was to alkali, several reflux tests were made. In these tests, panels coated with the phenolic coating were refluxed in 0.025, 0.05, and 0.1N sodium hydroxide. After 336 hours none showed signs of failure. The

Type of Coating	Modifying Resins	Weeks on Test	Current to Panels, ma			Condition of Coating			
						Coupled		Uncoupled	
			Bare Panel	Scribed Panel	Unscribed Panel	Scribed Panel	Unscribed Panel	Scribed Panel	Unscribed Panel
Epoxy	Phenolic	1	0.89	0.15	0.05	OK	OK	OK	OK
		2	0.78	0.10	0.04	TB-8	TB-8	TB-8	TB-8
		4	1.23	0.10	0.06	TB-8	TB-8	TB-8	TB-8
		8	0.86	0.10	0.07	PB-8	PB-7	TB-8	PB-7
		15	0.82	0.08	0.06	CB-4	CB-4	PB-8	PB-7
Epoxy ester	2	1	1.05	0.10	0.05	OK	OK	OK	OK
		2	0.98	0.10	0.04	OK	OK	OK	OK
		4	1.38	0.13	0.03	OK	OK	OK	OK
		8	0.89	0.19	0.05	OK	OK	OK	OK
		15(1)	0.78	0.31	0.10	CB-6	PB-6	TB-8	OK

Note: TB – Trace of blistering.
PB – Partially blistered.
CB – Completely blistered.
Numbers following TB, PB, and CB are ASTM blister ratings, reference 1946 Standards, 1171.
Scribe is bare area in center of panel, 1/8 inch x 2-1/2 inches.
Approximately 7.3 square inches of coating faces anode.
Side facing anode = 1.75 mils of coating.
Side away from anode = 0.75 mil of coating.

To obtain apparent current density in ma/sq ft, multiply current given in table by 19.8.

(1) Marked increase in current occurred.

Table 3. Magnesium-anode test results — 2,000 ohm-cm water

results given in Table 1 show that the same coating failed in 0.2N alkali at 180 F within 200 hours. The applied-potential data show failure of the coating within 24 hours.

Magnesium-Anode Test

Since it was desirable to evaluate coatings in a cathodic environment more closely simulating that of a hot-water tank protected with magnesium anodes than did the applied-potential test, a magnesium anode test was designed (see Figure 3). For this work, a number of test cells were set up. Each cell consisted of a 10-inch diameter ¾-inch thick Bakelite cover used for mounting equipment and of Pyrex jars for holding conductive solutions. A six-inch length of regular magnesium anode stock 1.05 inches in diameter was secured in the center of each cover. Eight test panels (the shape of these panels were identical to the panels used in the applied-potential test) were connected to the anode by individual 10-ohm resistors. These panels were spaced evenly around the anode such that the distance from the center of the anode to the center of each test panel was three inches. An additional group of coated test panels were secured to the plastic cover, located behind the panels coupled to the anode. This second group of panels was not connected to the anode. Each plastic cover and assembly was then fitted into a two-gallon Pyrex jar containing 2,000 or 20,000 ohm-cm water. The low-resistance water was made up by adding magnesium chloride to Columbus, Ohio, tap water until the resistance decreased to 2,000 ohm-cm. The high-resistance water was made by adding Columbus tap water to distilled water. Each of the Pyrex jars was mounted in a water bath held at 180 F. The water was changed each day by introducing cold water into the bottom of the jar, forcing the hot water out at the top.

The performance of the coatings was checked by visual examination

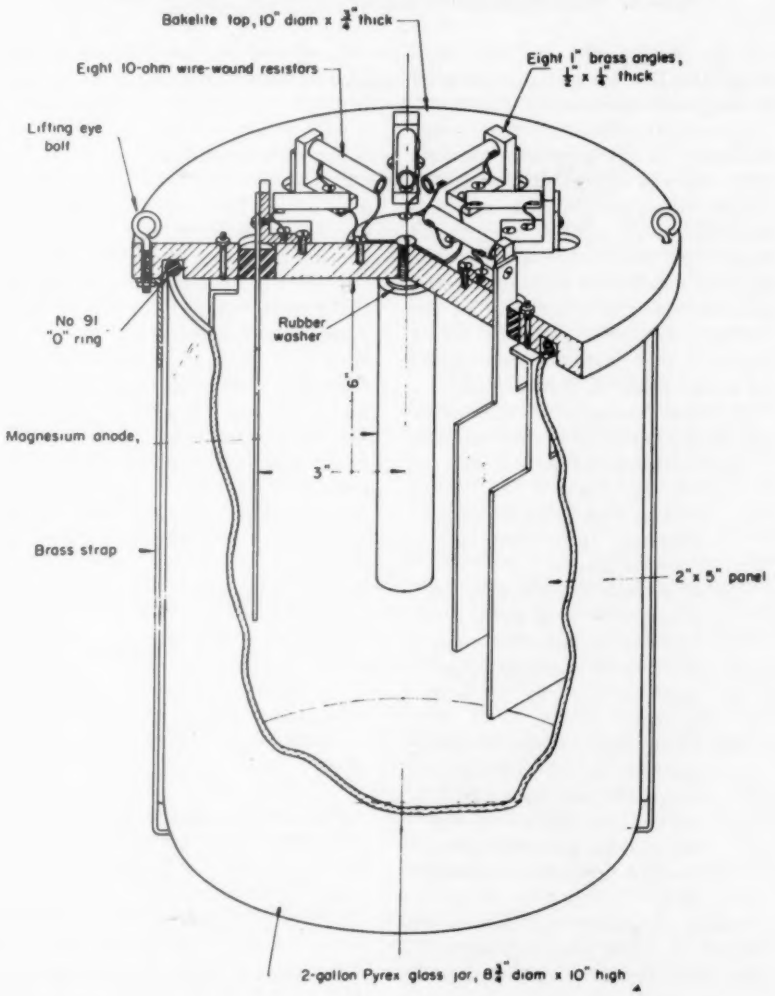

Figure 3. Isometric drawing of magnesium-anode test cell

Type of Coating	Modifying Resins	Weeks on Test	Current to Panels, ma			Condition of Coating			
						Coupled		Uncoupled	
			Bare Panel	Scribed[1] Panel	Unscribed Panel	Scribed Panel	Unscribed Panel	Scribed Panel	Unscribed Panel
Epoxy	Phenolic	1	5.72	0.83	0.07	OK	OK	OK	OK
		2	4.27	0.78	0.05	OK	TB-9	OK	TB-9
		4	4.12	0.82	0.05	TB-8	PB-8	TB-8	TB-8
		8	3.08	0.52	0.05	PB-8	PB-8	TB-8	TB-8
		15	2.35	0.38	0.07	PB-3	PB-6	TB-6	TB-8
Epoxy ester	–	1	5.44	0.45	0.04	OK	OK	OK	OK
		2	4.18	0.40	0.04	OK	OK	OK	OK
		4	3.32	0.45	0.06	OK	TB-9	OK	TB-9
		8	1.85	1.07	0.26	PB-8	PB-8	TB-9	TB-8
		15	1.70	1.40	0.60	CB-4	CB-2	PB-8	TB-8

Note: TB – Trace of blistering.
PB – Partially blistered.
CB – Completely blistered.
Numbers following TB, PB, and CB are ASTM blister ratings, reference 1946 Standards, p 1171.
Scribe is bare area in center of panel, 1/8 inch x 2-1/2 inches.
Approximately 7.3 square inches of coating faces anode.
Side facing anode = 1.75 mils of coating.
Side away from anode = 0.75 mil of coating.

To obtain apparent current density in ma/sq ft, multiply current given in table by 19.8.

(1) Marked increase in current occurred.

Table 4. Magnesium-anode test results—20,000 ohm-cm water

and by noting the voltage drop across the 10-ohm resistors coupled to the panels and to the anode.

The results obtained on coatings evaluated in the magnesium-anode cells were in agreement with the results obtained in the applied-potential test. The magnesium anode test data showed that the effects of cathodic protection contributed most to the failure of the coatings and that coatings giving the best performances were based on epoxy-phenolic formulations.

A visual inspection of the coated panels during the test showed that:

(1) Coatings on panels electrically coupled to the anodes were more severely blistered than were uncoupled panels.
(2) Blistering appeared to be progressive with time.
(3) Coating deterioration was most severe along edges and at corners of test panels.
(4) Blistering, unless it progressed to an advanced stage, did not appreciably affect the ability of the alkali-resistant coatings to control protective current flow.

Table 3 shows the results obtained in 2,000 ohm-cm water on the alkali resistant epoxy-phenolic coating and on the comparatively alkali-resistant epoxy ester coating in test for 15 weeks. In each case, it will be noted that the bare panel current decreased as more of the metal was covered with a calcareous deposit. The currents drawn to panels with the alkali-resistant coating did not increase during the 15 weeks' test period, even though there was some blistering. The epoxy ester coated panels, however, showed a marked increase in current flow at the eighth week. This increase was apparent on both scribed and unscribed panels. The epoxy ester coating was completely covered with blisters up to ¼-inch in diameter. Coatings on panels coupled to the anode were more severely blistered than were coatings on uncoupled panels.

Table 4 shows the results obtained on these same coatings in the 20,000 ohm-cm water. In this water, the same pattern of coating performance occurred which was observed in the 2,000 ohm-cm water. That is, panels with the alkali-resistant epoxy-phenolic coating did not draw increasing currents during the test period, while panels with the epoxy ester coating showed a marked increase in current flow after the fifteenth week.

In both waters, the condition of the coatings on the sides of the panels facing the anode was comparable to the coatings on the sides away from the anode.

Current Density in the Magnesium-Anode Test

During the first week in test, cells filled with 2,000 ohm-cm water had current densities which averaged 99 and 103 ma/sq. ft. These current densities were determined on panels having seven-square-inch areas of metal facing the anodes. This area corresponded to the coated areas facing the anodes. These coated areas were about eight square inches.

In Tables 3 and 4, the current flow to each panel is given rather than current density, because (a) it is assumed that some current flow occurred to the side of the panel away from the anode and that (b) the current is not equally distributed over the side of the panel facing the anode, since protective currents are concentrated in areas where metal is exposed. An idea of the current density in a scribed area can be had comparing the current flow of scribed and

Coating	Condition After 6 Months	Current-ma Per Panel at 6 Months	Current Drawn to Panel, ma				Bare Panel Current, ma		Blister Rating	
			Min	Max	Avg	Final	Avg	Final	ASTM Size	Area Blistered %
1-mil 30% pigmented primer, 2-mil clear topcoat	Excellent. Few scattered blisters; current effectively restricted	0.10	0.02	0.37	0.15	0.2	0.9	0.61	2	90
1-mil 50% pigmented primer, 2-mil clear topcoat	Excellent. Few scattered blisters; current effectively restricted	0.17	0.002	0.68	0.40	0.33	0.9	0.81	2	100

Epon phenolic used as vehicle in both primer and topcoats. To obtain apparent current density ma/sq ft for coating facing anode – multiply ma by 19.8.

Table 5. Performance of two-coat systems in magnesium anode test

unscribed coatings in the same system. For example, from Table 3 the current flowing to scribed panel is 0.83 ma, while the current flow to an unscribed panel is 0.07 ma. If the difference of 0.76 ma is considered as being concentrated in the scribed area which is 5/16 sq. in. a current density of 350 ma/sq. ft. is obtained. This current density results in the production of the equivalent of 0.20 grams of hydroxyl ions in one hour.

Long-Term Tests

Another study made in the applied potential test included the evaluation of a two-coat system of the alkali-resistant epoxy-phenolic coating. In this work the clear coating was pigmented to 30 and 50 per cent by volume with TiO_2. These coatings were used as primer coats on the regular test panels at a one-mil thickness. A two-mil film of the clear epoxy-phenolic material was used as a top coat.

The results of this test are given in Table 5. They show that at the end of a six-month test period these coatings were in excellent condition; only a few scattered blisters were found on the panels with the 30 per cent pigmented primer. Although the 50 per cent pigmented primer system was blistered to a greater extent, it was still in excellent condition. At the end of 9½ months, both systems were severely blistered, and were still effective in restricting protective current flow. The reasons for the excessive amount of blistering which occurred after six months are not known.

Pigmentation Study

In order to determine the possibility of minimizing the blistering of alkali-resistant coatings, a pigmentation study was made. The purpose of pigmentation was to control the permeability of the coating in such a way that a more or less free movement of liquid could occur through the coating. It was visualized that if the tendency for liquid to become entrapped between the coating and the substrate could be controlled, blistering might be limited. This approach was a compromise in this work since an increase in the permeability of a coating would decrease its ability to control the protective current flow.

Pigment Volume-Conc.	Current to Panel After 3 Days, ma: Scribed Panel	Current to Panel After 3 Days, ma: Unscribed Panel	Remarks
50	30	27	No. 6-No. 7 blisters scattered over panels; blisters are flat and are more numerous on scribed panel; good condition as far as blistering is concerned
40	21	18	No. 4-No. 5 blisters over panels; blisters are raised and are more numerous near scribed; both panels in poor condition
30	9	3	No. 5-No.6 blisters on unscribed panel; No. 3-No. 6 blisters on scribed panel; condition poor
20	4	0.03	No. 8 blisters scattered over unscribed panel; condition good; No. 4-No. 7 blisters on scribed panel; condition good
10	3	0.03	A few scattered No. 8 blisters on unscribed panel; No. 7-No. 8 blisters on scribed panel; condition very good
0	3	0.03	Scattered No. 9 blisters on unscribed panel; No. 8-No. 9 blisters on scribed panel; condition very good

Note:

Test Conditions

Applied Voltage 2.5 volts
Electrolyte 1000 ohm-cm water (distilled water with NaCl)
Temperature 180 F
Bare-Panel Current about 33 ma per panel

Panels were masked with Scotch Electroplaters Tape No. 471. All coatings were 3 mils thick. Scribed panels were damaged on both sides with an "X" mark 2 inches in height. Blistering rated in accordance with ASTM Specification, 1946 Standards, p 1171.

Table 6. Performance of TiO_2-pigmented epoxy-phenolic coatings in the applied potential test

In the pigmentation study the epoxy-phenolic coating was pigmented in 10 per cent increments up to 50 per cent pigment volume concentration with TiO_2. These pigmented systems were evaluated in the applied potential apparatus for three days.

In Table 6, it is seen that coatings pigmented from 0 to 20 per cent were effective in restricting current flow to about one-thousandth of the bare-panel value, and were only slightly blistered. Coatings with 30 and 40 per cent pigment by volume blistered badly and restricted current flow to about one-tenth and one half of base-panel current, respectively. At the 50 per cent pigment level, the incidence of blistering decreased, but the current flow was almost equal to the bare-panel value.

The results of this limited pigmentation study have shown that with pigmentation above 20 per cent by volume, the permeability of the coatings is greatly increased, and that there is some reduction in blistering at 50 per cent pigment level as compared with the 30 and 40 per cent levels. The incorporation of TiO_2 into the epoxy-phenolic coating did not appear to improve the performance of the clear coating for this work at any of the pigment levels chosen.

During the course of this pigmentation study, it became apparent that it might be possible, by a careful control of types and amounts of pigments employed in the formulation, to control the protective current to a point where a decrease was realized, but the current would still be below that point where excessive blistering would occur, and protection would still be realized. Some preliminary testing indicated this scheme might have some merit, and that the subject should receive further study.

Simulated Hot-Water Tank Test

In view of the fact that the effects of cathodic protection caused the greater part of coatings deterioration in both the applied potential and magnesium-anode tests, it was thought advisable to use a test that might minimize these effects and that would more closely simulate the environment

Tank No.	Condition of Coating	Water Resistivity, ohm-cm	Current, ma/sq ft				Remarks
			Min	Max	Avg	Final	
1	Unscribed	2,000	1.42	2.16	1.65	1.58	Many tiny blisters (No. 9 ASTM) over entire coating
2	Scribed(1)	2,000	2.05	3.74	2.60	2.57	Many tiny blisters over entire coating (No. 9 ASTM). Larger blisters around scribe

(1) Scribe was "X" mark running the vertical length of coated surface. Initial current density on uncoated tank = 20.9 ma/sq ft.

Table 7. Coatings on simulated hot-water tanks

of a cathodically protected hot-water tank than did the magnesium-anode test. For these reasons, a simulated hot-water tank test was set up. In this test, a six by six-inch iron-pipe nipple was capped on one end and completely coated on the interior with a three-mil coating of an epoxy-phenolic formulation. The open end was capped with a plastic cover on which a magnesium anode was centered. To control the magnitude of the protective current, the anode was coupled to the pipe through a 10-ohm resistor. Two such pipes were then filled with 2,000 ohm-cm water, which was made up in the same manner as the water used in the magnesium anode test. Both scribed and unscribed coatings were tested. The pipes were held at 180 F and daily measurements were made of the voltage drop over the 10-ohm resistors.

It should be noted that the chief differences between the simulated hot-water tank test and the magnesium-ancde test are:

(1) The coatings in the simulated hot-water tank test were applied to curved surfaces, thus limiting the effects of current concentrations at edges and corners.

(2) Only one coated surface was exposed to the test environment in the simulated hot-water tank. In the magnesium-anode test, both sides of the coated panels were exposed to the electrolyte.

The coatings on the simulated hot-water tanks were in test for 17 weeks. An uncoated tank was not run. However, the initial current density on an uncoated tank was 20.9 ma/sq. ft.

At the end of the 17-week test period, the coatings in this test were in much better condition than were identical coatings tested for 15 weeks in the magnesium-anode cells where the initial current density was 18.0 ma/sq. ft. (Table 4, data for epoxy-phenolic coating). The coatings on each of the pipes were practically unchanged, except for numerous tiny blisters, and the coatings had effectively restricted the protective current flow during the test period. The performances of the coatings in the simulated hot-water tank test are shown in Table 7.

Conclusions

It is believed that this work has helped to define the requirements of organic coatings for use in domestic hot-water tanks protected with magnesium anodes, and for their use with cathodic protection in general. The chief requirements of organic coatings in this use are alkali resistance, and water impermeability. At the present time, alkali resistance is thought to be the more important requirement because organic films do not offer perfect barriers to water and to solute ions. Once an organic coating over a cathodic substrate is penetrated by water and by dissolved ions, alkaline solutions are formed. These alkaline solutions are concentrated enough to destroy an alkali-sensitive material The evolution of hydrogen gas at cathodic areas does not seem to affect the coatings. Although liquid does penetrate organic films on cathodically protected iron, corrosion is prevented by the alkaline solutions formed under the coating.

Coatings based on epoxy-phenolic resin combinations appear to offer promise for use in coating cathodically protected hot-water tanks. The blistering of these coatings in a cathodic environment does not seem to appreciably affect the electrical resistances of the films and their ability to control protective current flow by reducing the area of the cathode. However, there are indications that the blistering of the alkali-resistant coatings is progressive with time, and that a complete loss of coating adhesion could occur.

The life of an organic coating used in conjunction with cathodic protection could be prolonged by eliminating as far as possible sharp edges and corners from coated and cathodically protected structures. The elimination of points at which protective currents concentrate would minimize coating deterioration.

The good performance of the epoxy-phenolic coating on the simulated hot-water tank as compared with coatings on the paddle-shaped panels tested at approximately the same current density in the magnesium anode test, have shown that there is a good possibility of using organic coatings to advantage in a cathodically protected hot-water tank. It is thought that highly alkali-resistant epoxy-phenolic coatings will perform satisfactorily with cathodic protection in areas possessing waters of high electrical resistance and where protective current densities will be low. However, more work should be done to determine the possibility of developing coating systems for use where current densities will be high. The objective of such work would be an elimination of coating blistering. The study of various pigment types and pigment levels in a highly alkali-resistant vehicle would seem to be the best approach to this problem. The applied potential apparatus described in this paper would be a great aid in this type of work.

Acknowledgement

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DEVELOPMENTS IN STEEL CONTAINERS SOLVE SHIPPING PROBLEMS

THE PAINT and varnish industry, long the nation's number one user of steel shipping pails also accounts for a notable percentage of the consumption of light and heavy gage drums. In recent years, a number of important developments in the steel container industry have expanded the scope of these containers; they have become highly suitable for "hard-to-package" products; their value as sales promotion material has increased; and the development of standard container specifications is eliminating unnecessary expense in handling and shipping. Users are also making the most of the versatility of shipping drums as evidenced by the growing use of paint circulation systems direct from drums.

Steel containers are usually broken down into three classifications. "Heavy" drums have a capacity of 13 gallons or more and are made in 18 gage steel or heavier. "Light" drums also have a capacity of 13 gallons or more but they are made in 19 gage or lighter steel. "Pails" have a capacity of 12 gallons or less and are made in 20 gage or lighter steel. Most of the pails produced have a capacity of 5 gallons and are usually made in 24 gage steel. Listed here are the gages of steel most commonly used for containers; note that as the gage number increases, the thickness of steel decreases.

Label identifies new steel shipping containers over 13 gallon capacity. It assures users that the container is true to gage and specifications.

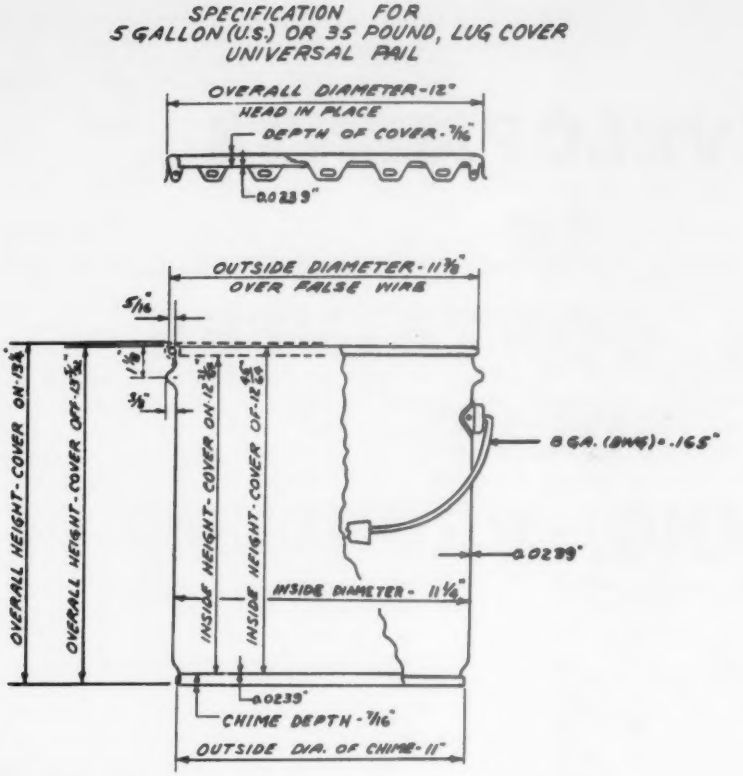
Most products in the paint and varnish industry are considered "regulatory" and thus the steel containers used for them come under the authority of regulations published by the Interstate Commerce Commission. These regulations are contained in "Agent H. A. Campbell's Tariff No. 9" published by the Interstate Commerce Commission and available from the Bureau of Explosives, New York, N. Y.

Under other rigid ICC rules, steel container manufacturers must emboss their name, date of manufacture, metal thickness and specification to which it conforms on the bottom of every drum produced. This is assurance to users that each and every new drum is identified exactly as to gage and specifications.

This is but one advantage to users of new drums. In addition, the cleanliness and overall excellent condition of new drums is an important factor in maintaining product purity and appearance is, in itself, no small part of the value of new drums.

Protective Linings

Where only a negligible quantity of lined containers were used six years ago, they today account for about 20% of all container production. Great strides have been made in the development of lining materials and in the equipment and techniques used for their application. The Steel Shipping Container Institute has, for the past eight years, sponsored a comprehensive research program at Battelle Memorial Institute. Out of this program have come two lining materials which have proved excellent for many "hard-to-pack-



Recommended universal standard specification for a 5-gallon, lug cover pail. This container, widely used in the paint industry, is designed to comply with Rule 40 of the Uniform and Consolidated Freight Classifications and ICC specifications 37D.

age" products. The latest of these linings, designated as "Synthetasine 200" is a combination of phenolic and epoxy resins. It combines the high strength and resistance to damage of the epoxy resins with the overall excellent chemical corrosion resistance of phenolic resins, which have been found too brittle to stand up under the rough handling to which drums are often subjected. When properly applied, the new lining material can stand a blow from a ball-peen hammer on the outside of a drum without cracking. The new material is made available through commercial manufacturers of lining materials who are licensed by Synthetasine Protective Coating, Inc., a corporation whose stock is wholly owned by members of the Steel Shipping Container Institute.

Numerous other protective coatings are also available commercially from suppliers who have had wide experience in the field of container linings. They are in a position to advise which materials can best be shipped in which lining. Today, with a protective coating, almost any product can be shipped safely and economically in new steel containers.

Among other materials in use for drum linings are vinyl, which is used largely in the food industry, oleoresinous linings which though economical do not offer a high degree of corrosion resistance, and various other synthetics such as styrene-butadiene, neoprene, polyethylene and plasticized phenolics Polyethylene, which might be considered an excellent lining material, presents a serious drawback in that it does not adhere well to steel and it permits the diffusion of liquids. Polyethylene bags are in use but here again, liquids may diffuse through the film and, if corrosive, cause rusting of the drum. At times, bags are used in conjunction with a drum lining but newer coatings make this practice virtually unnecessary.

Additional Container Treatments

Not only have linings on steel containers been developed to a remarkable degree but the steel used for containers is also undergoing new treatments. Two types of steel are used; hot rolled steel which has a very thin (and protective) coating of oxide on the surface; and cold rolled steel which is free from oxide. Under various conditions, each of these steels provides advantages over the other. For example, a thin, tightly adhering coating of scale is beneficial for increased protection of some lining materials. In other cases, hot rolled steel may be sand or shot blasted; or both types of steel may be phosphatized. Manufacturers should be consulted to determine which type of container treatment will best suit requirements.

METAL THICKNESS ACCORDING TO GAGE NUMBER

Gage No.	Thickness in inches	Gage No.	Thickness in inches
12	.1094	18	.0500
13	.0937	19	.0437
14	.0781	20	.0375
15	.0703	22	.0312
16	.0625	24	.0250
17	.0562	26	.0187
		28	.0156

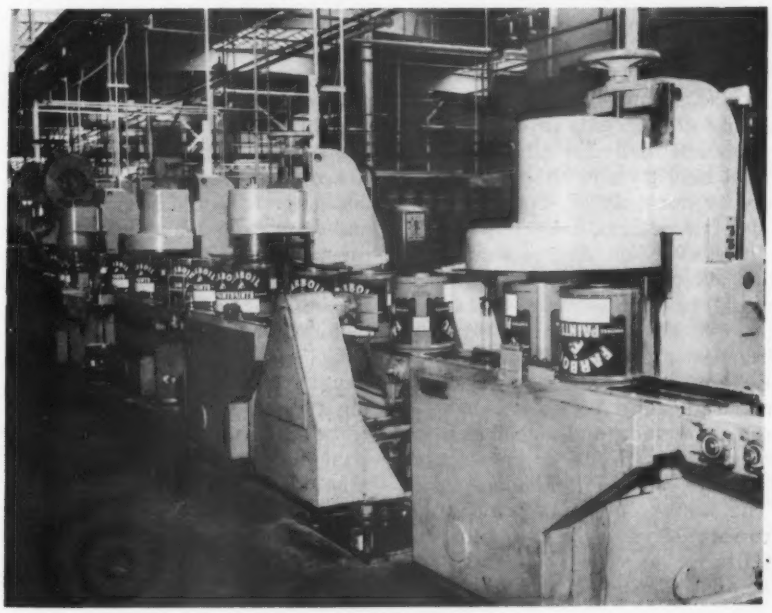
Decorated Containers

Containers of all sizes which have been painted, lithographed or decaled are now standard in the paint industry. The value of these containers as point of sale or point of use displays is being realized by many concerns. Now with drums as well as smaller containers entering customers plants or stores, they serve as constant reminders of the manufacturer, his product and help to achieve brand recognition rapidly. The days of one small stencil used to identify the contents of a relatively huge 55-gallon drum are rapidly becoming past history.

Standard Drum Specifications

There is an almost endless variety of steel shipping containers in use; in many cases varying only slightly in dimensions or construction details. In order to achieve wider uniformity in drum specifications, the SSCI has been working with the National Paint, Varnish & Lacquer Association and other groups representing major container consuming industries for the development of "recommended universal standards." To date, ten standards have been established and approved by various groups. Copies of these standards are made available to all interested persons and new studies are undertaken as the need becomes apparent.

A small part of the production line for 55-gallon drums. High speed drum lines, such as this, turn out over 500 drums per hour so mfrs. can meet the demand.



The steel container industry, ever alive to the needs of container users, is continuing a tremendous research and development program for the Steel Shipping Container Industry at Battelle Memorial Institute. Many individual member concerns, of course, maintain research and development laboratories of their own. Progress to date indicates the possibility of many new uses for steel containers as well as added advantages from current uses.

High-speed production line for five gallon pails. Each operation is so carefully controlled to assure tightness, uniformity. Exteriors are usually printed before steel sheets are formed; interior coatings are applied to finished container and then baked.

TECHNICAL DEVELOPMENTS IN THE PAINT INDUSTRY

By
H. O. Farr

MIXING of colours and their application to surfaces is as ancient as sculpture, and had its beginning in the early days of modern man, thousands of years ago. Archeologists have discovered pictures on the walls of tombs painted with gum and pigment over plastered stone; pictures on the whitewashed clay of desert cave temples; altarpieces on wood; pictures on silk or linen buried for centuries; drawings on parchment and paper; paint on stone, metal, glass, and ivory. Earliest paints, 50,000 years ago, consisted of lime, earth clays, and burnt bones mixed in water. The Egyptians advanced the elementary chemistry of paints by adding additional colours through firing or roasting earth pigments, and mixing the expanding range of pigments with binders including gums, glues, pitches, egg, oils and waxes. At the time of the Renaissance, artists had acquired a sense for colours which is touch unsurpassed today.

It was not until the 17th century that serious thought was given to protecting valuable paintings against deterioration and decay. About this time the practice of putting a varnish over oil paintings was generally adopted. These early varnishes contained either fossil gums, principally amber or copal, cooked in oils, or solutions of natural gums such as mastic, damar, and sandarac.

In the last 25 years scientists have combined their efforts with artists in preserving artistic treasures. Synthetic surface coatings have been found to overcome the typical oxidation and discolouration of gum varnishes. Polymerized vinyl acetate and acrylic polymers, which are clear and colourless, are now employed to protect oil paintings, with a coating of wax added to reduce moisture permeability of the film.

Perhaps it is fair to say that the paint industry today evolved from the ancient art of painting. The mixing of pigments in binders remains essentially the same, but the paint industry now has the responsibility not only of supplying colourful decoration, but protection to almost every building material and finished product. Historically, it would be more correct to say, I believe, that the paint industry began at the time of the Industrial Revolution. When man began to make substantial quantities of consumer products and machines from metal, the need for protection against corrosion became acute. The first paint and varnish factories evolved in the 18th and 19th centuries to cope with these demands. The advent of the modern production line placed further problems upon the paint manufacturer and the expanding building and construction industry demanded better protective and decorative finishes. Today in Canada these demands are being met by an industry of over 100 paint manufacturers who supply annually 100 million dollars of paint products.

Art to Science

The modern paint industry, founded on the need for supplying decoration and protection, owes its greatest technical advancement to the growth of the chemical industry in the last 35 years. It was during this period that paint making changed from an art to a modern science. No longer were the natural gums and resins together with vegetable oils adequate to afford the speed of dry necessary to keep up with modern production lines, nor to afford the protection and decoration demanded in finishing manufactured products. White lead in oil gave way to better finishes for the home. Red lead in oil found newer pigments and better vehicles competing in the field of metal corrosion prevention. Baking type Japans were soon found to be wholly inadequate for industrial finishing. Of course paint manufacturers resisted the synthetic materials coming from the new chemical industry, just as many resisted the coming of the horseless carriage.

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Desperate attempts were made to develop better finishes from the older natural raw materials. Much fine work resulted, especially in the field of varnish cooking — more natural resins were tried — oil processing methods improved — in fact, the art of varnish cooking known only to the varnish cooker, slowly changed and the factors of time, temperature, agitation, the order of adding ingredients, etc., had to be recorded. Thus the modern cooking log evolved.

Advances in Vehicles

Let us look briefly at some of the modern chemical developments which made it possible for paint making to change from an art to a science. The greatest advances have been in vehicles or binders.

Prior to 1920, paint vehicles were composed of vegetable oils, linseed and tung oil primarily, and varnishes made by cooking natural gums, including kauri, damar, rosin, copal, and asphaltum, with vegetable oils. Phenol-formaldehyde plastics, called Bakelite, discovered about 1910, within a few years attracted the attention of the varnish cooker. Here was a resin of excellent chemical stability, which only needed modification to permit solubility and reactivity when cooked with vegetable oils in order to give films of greater water and chemical resistance than before. Newer and better phenolic resins employing substituted phenols have maintained the position of this first synthetic resin.

In 1925, nitrocellulose, previously only available in high viscosity types, was produced in low viscosity types and, with newer solvents available from the expanding chemical fermentation industry, fast drying lacquers became practicable. They were quickly adapted to automotive production lines, using a spray gun for application, and the time required to finish automobiles was reduced from days to hours.

In recent years synthetic enamels have replaced lacquers in some applications, but the introduction of hot spray techniques has revived interest in lacquers.

In the 1930's, the broadest advancement in vehicles yet known occurred through the oil modification of "Glyptal" or alkyd resins to gain solubility in mineral thinners. Older type varnish vehicles were gradually replaced with these oil modified alkyd resin solutions. Because of so many possible modifications of this versatile polymer, its ready compatibility with other film forming resins, and because of its inherent excellence in flexibility, adhesion, and exterior durability, more paint materials today contain this type of vehicle than any other type. Recently it has been learned that a partial replacement of phthalic anhydride with para-tertiary-butyl-benzoic acid affords films with better gloss, better through hardness, and improved durability.

Urea formaldehyde resins were soon found to be compatibile with alkyds and blends were quickly adapted to improve baking finishes. In 1936, melamine formaldehyde resins were introduced to the paint chemist as an even better material than urea resins, especially where higher baking temperatures were required. Most baking finishes today contain urea or melamine resins as part of the binder. In the past two years, forced dry and air dry acid catalysed urea-alkyd solutions have attracted considerable attention in the wood finishing field.

1936 also saw the commercial production of vinyl resins, thermoplastic polymers and copolymers of vinyl acetate and vinyl chloride. Baked films showed unusual chemical resistance. Problems of adhesion to metals, proper means of plasticizing and stabilizing these films upon baking were soon solved, but price tended to restrict their wide usage in paints except for special applications. Air dry types soon followed. An excellent acid etching wash primer for metal was developed using polyvinyl butyral.

Acrylic resins also appeared at this time, affording clear, durable, chemically resistant films. In 1938 chlorinated rubber and rubber hydrocarbon resins were successfully plasticized to give air dry films with excellent resistance to acids and alkalies.

At the outbreak of World War II, the paint industry was reasonably proficient in using the many synthetic resins created by the chemical industry as the result of fundamental research on functionality and cross linkages of polymers by Carothers, Kienle and others. Much fine work on drying oils, rosin modifications, and development of additional cellulose ethers and esters had been accomplished. Means of employing semi-drying and non-drying vegetable oils in order to afford better colour retention and resistance to yellowing upon baking had been discovered. Soybean, cottonseed, cocoanut, and castor oils replaced linseed and tung oil in certain applications. The variety of modifications of rosin derived from the destructive distillation of pine stumps, illustrates just what was done through modern chemical concepts. Ethyl cellulose, cellulose aceto butyrate, methyl cellulose and carboxy methyl cellulose added to the growing list of film forming materials.

Since World War II, two new synthetic resins have created considerable interest in the vehicle field. Silicone resins have been shown to possess substantially greater resistance to high temperatures than any previous vehicles. Epoxy resins, condensation products of epichlorohydrin and bisphenol A, have shown excellent adhesion, chemical resistance, and stability upon baking at high temperatures. This new versatile resin may be used in a variety of ways - in conjunction with phenolic or amine resins to afford baking type coatings for cans, drums, tubes, closures, etc. with excellent adhesion, abrasion resistance, and chemical resistance, although baking temperatures of 400°F are required for proper curing; as an ester when epoxies are reacted with fatty acids to afford metal finishes usually superior to alkyds in flexibility and chemical resistance. Epoxy esters have so many excellent film properties that they are already replacing alkyd type finishes in certain applications.

The synthetic rubber industry, created out of necessity during the war, has contributed greatly to paints by affording styrene and butadiene. Styrene treated oils and styrenated alkyds have made possible faster drying coatings with good durability. Rubber latex has opened a vast market for emulsion paints. Butadiene-styrene latex has been widely employed in the last five years in so called "rubber-

ized" emulsion paints for plaster, wallboard and wallpaper. Polyvinyl acetate emulsions are currently leading the race in exterior coatings for masonry and wood surfaces. Acrylic emulsions and butadiene-styrene latex emulsions are in hot pursuit. Possessing ease of application, lack of paint thinner odour, quick dry and high moisture permeability, emulsion paints have created a vast market which likely will continue to expand at the expense of oil type paints. Odourless alkyd flats are offering the best competition.

Pigment Developments

Although developments in synthetic vehicles have had a more profound effect in formulating better paints, new and better pigments have also contributed greatly. In the white pigment field, titanium pigments first introduced in 1918, have completely overshadowed and to a large extent replaced white lead, zinc oxide and lithopone.

The colour and dye industry created in North America in World War I has afforded the paint industry many new dyes and pigments. The water insoluble azo dyes, possessing the chromophore group - N = N -, include brilliant reds such as Toluidine, Para Red and Chlorinated Para. The BON reds and maroons precipitated as calcium or magnesium salts of beta-hydroxynaphthoic acid coupled with organic amines, are bleed resistant, light fast, fugitive in tints, but durable in full tones.

The development of phthalocyanine blue and green pigments represented a real achievement. Formed from phthalic anhydride, urea and copper oxide, the blue pigment shows excellent light fastness, chemical resistance, high tinting strength, is stable to heat, and non-bleeding. The green is made from the blue by chlorination. Flocculation and crystallization tendencies when dispersed in paint vehicles have been corrected by resin-treating the pigment particles.

"Green Gold", a nickel azo yellow pigment, has excellent light and heat stability, chemical resistance and is non-bleeding.

The thio-indigo maroons and reds are the most permanent tinting pigments yet developed. Even in pale tints, they are resistant to fading. They are non-bleeding and do not contribute as do some pigments to film degradation. They are quite expensive ranging from $6.00 to $12.00 per pound.

Indanthrene yellows and oranges are similar to the thio-indigo reds in properties, although are probably slightly less durable. They do not darken as chrome yellows, fade and chalk as cadmium yellows, or bleed as Hanza or Benzidine yellows. They range from $12.00 to $18.00 per pound.

Improved chrome and molybdate oranges and yellows have been recently made available with greater resistance to fading and darkening on exposure. Synthetic iron oxide pigments have replaced natural oxide pigments in many applications.

An interesting development worthy of mention concerns the work of the *National Lead Company* in forming an envelope of prime pigment around the center core of an inert pigment such as silica. The economy inherent in this approach requires no explanation. Of course for a number of years dyes have been precipitated on bases such as aluminum hydrate to form lakes for use in paints.

In addition to synthetic vehicles and newer pigments, the chemical industry has made available to paint manufacturers a great number of solvents and thinners derived from coal, petroleum, and natural gas. Chemical plasticizers, driers, and special agents have also been supplied in great numbers.

Progress in Manufacture

The paint industry has also benefited from advanced design and engineering in manufacturing equipment. The day of the old stone mill has passed. In its place has emerged the high speed carborundum stone mill capable of a paste output of several hundred gallons per hour. Pebble mills have been improved by employing harder linings and higher density balls. Grinding time has been reduced by one-third, with less wear and contamination. High speed roller mills have replaced older slower types. Heavy paste dispersion mills of the Baker Perkins type have undergone radical changes through the introduction of differential blade speeds and improved design in blade shape and cross section. The recent development of high horse power, high velocity dispersion mills, which promote very rapid acceleration and deceleration of liquid paints, shows much promise for fast, economical dispersion of most pigments. Modern paste mixers and agitators, automatic filling machines, and the wide adoption of fork trucks for pallatizing materials have resulted in savings in labour, time, and space. The older type open varnish kettle has been replaced to a large extent by modern, fully enclosed resin kettles heated by Dowtherm, electricity, or natural gas.

Application & Testing

Progress has likewise been made in application equipment and techniques. We now have cold spraying, hot spraying, ionic spraying, and flame spraying, to complement brushing, roller application, dipping and flow coating. Advances in metal pretreatment methods have resulted in much better paint film adhesion and rust protection.

The paint technologist has been aided of course by progress in instrumentation - instruments to replace the knife, the spatula, and the finger nail in evaluating physical properties of paints and films. Instruments have been developed for measuring gloss, hardness, abrasion, elongation, flow, drying time and hiding. Analytical methods have progressed greatly and the spectrophotometer has now become necessary for rapid identification of complex constitutents of a paint product. Accelerated testing machines are employed to attempt to measure the effects of sun light, rain, fog, salt spray.

Bearing in mind that a few hundred years ago paints were employed for one main purpose, only decoration, and subsequently for decoration and protection, it is interesting to note today how technical advances in coatings have expanded the functional uses of paint. A partial list of today's uses would include:

1. Decoration or lack of decoration, such as camouflage.
2. Protection, including corrosion prevention, wood preservation, fire retard-

ancy, heat resistance, safety markings, radiation control.

3. Sanitation, including painting hospitals and food can linings.
4. Light distribution, infra red reflecting coatings, luminescent coatings which glow when light strikes and types with afterglow.
5. Insulation, - electrical as well as mechanical.
6. Antibiotic, - poisonous types which destroy barnacles, mildew or fungus.
7. Acoustical, - sound reflecting and sound absorbing types.
8. Temperature recording, - colour change with temperature.

Materials painted would include virtually all metals, wood, rubber, plastics, masonry, glass, textiles, leather, and paper. It would seem that there is a paint coating for every purpose.

I think you would agree that technical advances in paints have been more profound in the past 35 years than in all of the previous centuries of civilized man. We have hitched onto or married if you prefer, a dynamic chemical industry. Our paint technologists have assimilated and evaluated a staggering amount of information. The job of protecting and beautifying homes, buildings, machinery and equipment, and the tens of thousands of manufactured articles has been well done.

Role of Scientists

But before we derive too much satisfaction from a job well done, I think it is only fair to say that much of the credit for our industry's progress rightfully belongs to scientists in the chemical industry - the men who created and developed the materials we are using.

Paint chemists in our industry have been too busy trying to solve problems presented by consumers; too busy evaluating newer materials; too busy keeping production departments out of trouble; too busy educating sales personnel on technical aspects of coatings; too busy copying what competitors have done; too busy to dream a little. The approach to solving a coating problem has far too often been purely empirical - trial and error - usually ending by solving the problem but not knowing why.

Why do some pigments promote chalking or checking of vehicles while others do not? Catalytic photo-oxidation?

Why do paints sometimes lose dry? Drier adsorption?

What causes hazing, ghosting, loss of gloss? Poor sealing?

What causes seeding upon storage? Flocculation?

What causes blistering? A moisture condition?

What causes checking, cracking, loss of adhesion? Film too brittle?

The suggested answers are only partial answers at best. They are not scientific answers at all. They illustrate the lack of fundamental knowledge the paint chemist has of the physics and chemistry of complex mixtures and surface effects.

Fortunately, some progress has been made by scientists in the better understanding of the flow properties of paint mixtures and of surface chemistry. All too frequently, however, this type of fundamental work has been left to research institutions, technical societies, universities, and government laboratories. Only a few of the larger or more far sighted paint manufacturers have cared to invest in expanding fundamental knowledge of film behaviour. The day is coming soon when more and more attention will have to be given to these fundamental problems, or else the paint industry will cease to advance. The threat of hot metallic sprayed coatings, lower temperature curing ceramic coatings, the wide use of stainless steel, alloys and aluminum requiring no paint, and the expanding uses for plastics may hasten this day.

I like to believe that Gremlins do not survive in cans of paint. When production is unable to produce a batch correctly that has been produced before, there is a reason. When a paint product suddenly fails to satisfy a customer, there is a reason. When paint films fail prematurely, there is a reason. Often the reason may be simple, sometimes complex. The paint technologist in solving these problems may have to call on all of the fundamental scientific knowledge at his command. I think we can expect great progress in the years ahead in better understanding the chemical and physical forces and effects involved with macromolecules and the various surfaces they protect.

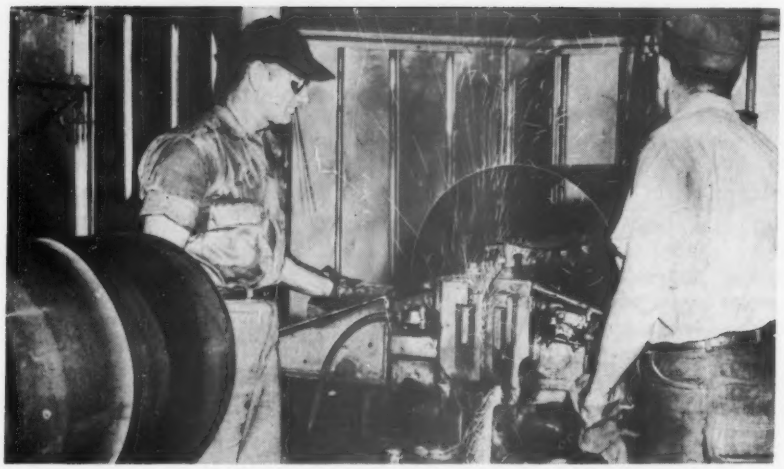
May I suggest a few things I believe the paint industry and the paint technologist should strive for in the future:

1. Incorporate a greater margin of safety in modern paint products. Allow for overbaking, over thinning, poor application. Make directions simple - lengthen package stability.
2. Develop reliable accelerated tests which truly correlate with actual exposure.
3. Give more attention to production supervision, methods and control. Newer finishes require far greater precision in mixing, grinding, thinning and tinting, than the excellent wetting oleoresinous materials formerly employed.
4. Develop real freeze-thaw stability in emulsion paints, eliminate more odour from odourless paints, produce better fire retardant paints, reduce toxicity of products, improve gloss and colour retention.
5. Create better instruments for measuring the physical properties of paints and films. Record these properties in reproducible scientific units of measure, not in such terms as "good", "fair", and "poor".
6. In solving problems, don't always take the empirical approach - dream a little.

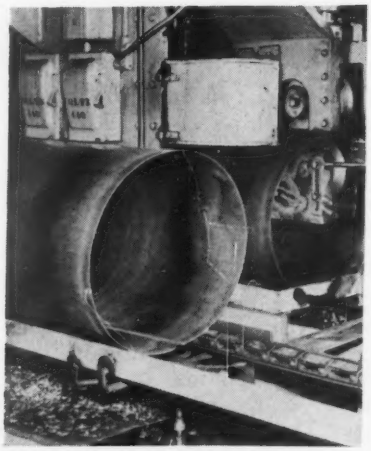
If chemists, physicists, and engineers face future paint problems with imagination and vision, the paint industry will continue its outstanding contribution to industry, government, and the citizens of Canada.

A TRIP TO PORT ARTHUR, TEXAS:

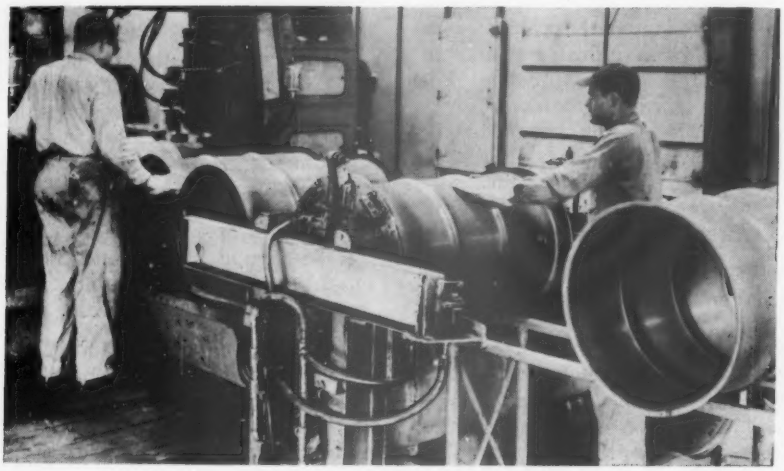
To See Jones & Laughlin's New Steel Drum Plant



An electrically operated butt welder is used by workers as they weld a fifty-five gallon, eighteen gage shell in the new plant.

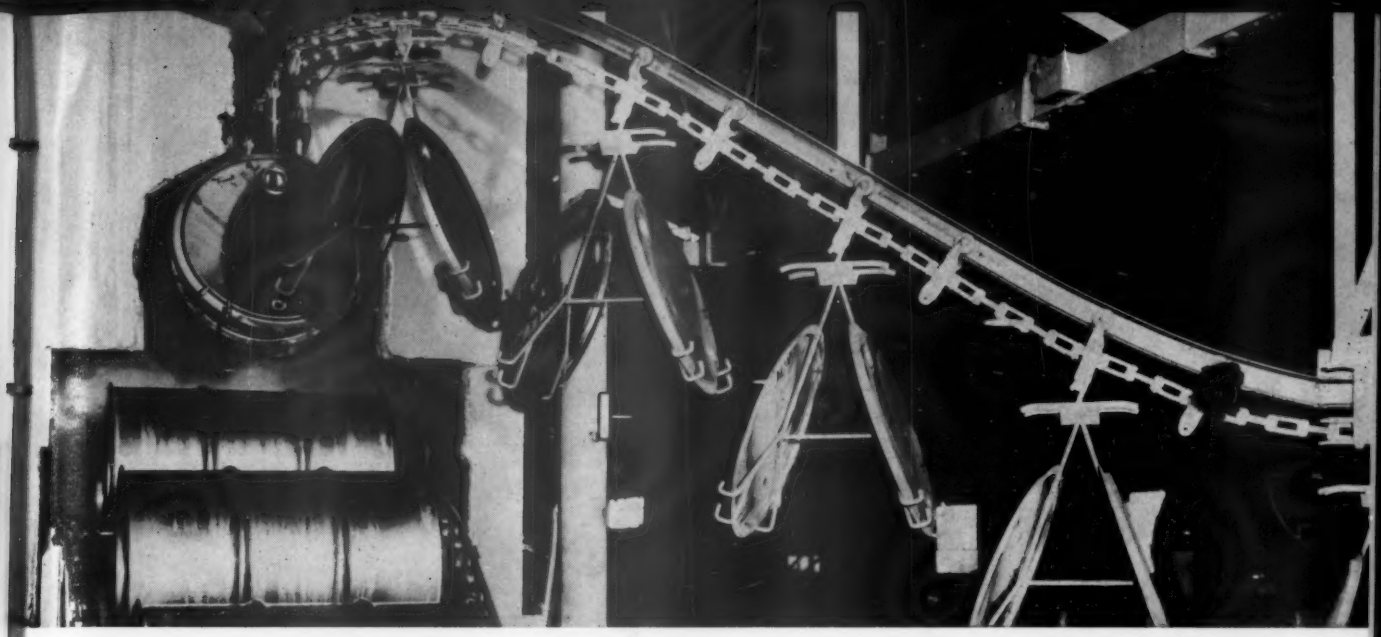


Flattened, smooth-out weld on container shells is made here on conveyor and weld re-roller.



In the production line heads and bottoms of the container are inserted into the container shell and then are double seamed.

Here the heads and bottoms of containers are blanked out by this 220-ton Warco head press.



Above, five-stage phosphatizing unit for giving drums a conditioned protective surface is called "JaLizing," a J&L processing development.

Left inset, below, shows product given both protection and trade identification at spray paint booth. One color for shell, another for heads and center.

Below, right, finished products move past the watchful eyes of the plant's general foreman on their way to box cars for loading and shipping.

Sears Opens Central Research Laboratory

SEARS, Roebuck and Co.'s newly constructed Central Paint Research Laboratories, consolidating the paint, resin and wallpaper laboratories under one roof, was formally opened last month.

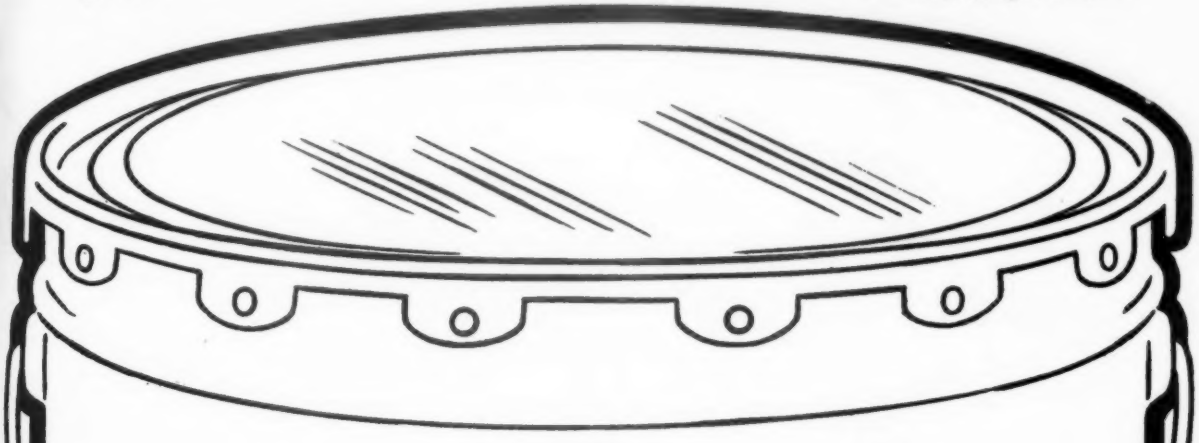
Prior to being housed at this new site, the paint laboratory was located at the Illinois Paint Works, the resin laboratory at the John A. Steen Varnish Co., and the wallpaper laboratory at Inland Wallpaper Co. All are Chicago firms owned by Sears and, together with the other Sears'-owned firms—Benjamin Franklin Paint & Varnish Co., Philadelphia; Carolina Paint & Varnish Works, Greensboro, N.C.; DeSoto Paint & Varnish Co., Garland, Texas; and Pacific Paint & Varnish Co., Berkeley, Cal.—will be represented by the Central Paint Research Laboratories. All factories are under the general managership of Samuel V. Greenberg.

The new construction is a single-story brick, steel and concrete building of 2,000 square feet. Its outstanding architectural feature is a 48 by 85 foot product development laboratory in the building free of uprights and columns.

George A. Nichols, technical director of Sears paint, resin and wallpaper factories, will head the new laboratory. He will have a staff of thirty-five research chemists who direct a total of 150 chemists in the company's paint, resin and wallpaper factories.

Here 35 research chemists and assistants will direct 150 chemists in various company plants.

Make friends with Continental's steel containers



Rust-proof re-usable
FLARING PAILS

Inside and out, Continental steel flaring pails are built to give your dry, powdered and viscous products the fullest measure of protection. Sales appeal, however, is just as much a part of these pails as sturdy construction. Brightly lithographed by Continental craftsmen, each container becomes part of a handsome package "family." And long after the original contents are gone, your name on these handy re-usable pails will help you sell not just one, but *all* the products in your line. Let us show you how Continental flaring pails can work for you. Call anytime.

Why not order "Tripletite" paint cans, "F" style and conventional cans when you order steel containers? We'll make up a "mixed" freight car to cut your costs on shipping, warehouse space and inventory.

A COMPLETE LINE—FIRST IN QUALITY

Durable, handsome Continental flaring pails available in 10 lb., 3½, 4, 5, and 6½ U. S. gallon sizes. 29-, 28-, or 26-gauge steel throughout. Bottom compound lined with 5 thickness strength for extra protection. Cover has deep gasket groove and full skirt to provide a sure seal. Beads near top, bottom or both for greater rigidity and strength. Covers specially designed to prevent sticking or jamming in storage. All pails nest snugly for economical shipping.

Continental makes a full line of closed head drums, lug cover pails and utility containers. Whatever your needs; Continental will supply the sizes and styles that fit your products best.

CONTINENTAL CAN COMPANY

Eastern Division: 100 E. 42nd St., New York 17
Central Division: 135 So. La Salle St., Chicago 3
Pacific Division: Russ Building, San Francisco 4

TAILOR-MADE PACKAGE SERVICE

for BUSINESS-BUILDING PERFORMANCE

For ten years before 1949, all coatings on hopper walls of a giant dredge were failing within six months. They couldn't take the severe corrosive action of salt air and water, hydrogen sulphide fumes rising from dredged material, and the rough abrasive action of sand and silt emptied into and out of the hoppers. In fact the longitudinal steel girders had lost more than 30% of their thickness from corrosion and abrasion.

In 1949, a four-coat system based on BAKELITE Vinyl Resins was applied. It completely arrested the eating-away process. Recently, after over five years' service (10 times that of other coatings), renewed protection has been applied using the same type of tough, dependable coating.

Metal and masonry surfaces of the receiving dock of this milk plant had become very unsightly from peeling and blistering of ordinary paints. Service conditions, of course, were tough. As if weather extremes aren't bad enough, lactic acid and live steam add to the maintenance problem here.

Therefore, a coating based on BAKELITE Vinyl Resins was specified and sprayed on. It has sealed the porous masonry surfaces and even bridged scars and cracks. Results: the coating is bright and clean looking, with thorough resistance to moisture, acids, alkalies and other destructive agents.

formulating is easier with BAKELITE "one-source service"

Over and over, outstanding performance indicates the kind of business-building service your coatings can give when they are based on BAKELITE Brand Resins.

By relying on BAKELITE as your major source you simplify purchasing; you know exact standards and are sure of uniform high quality; you have an extremely wide variety of resins to choose from; and you are sure of dependable service and technical help.

These are powerful benefits. Take advantage of them by making dependable BAKELITE Resins your base for bigger and better business.

COMPLETE TECHNICAL DATA
FORMULATIONS • PROCEDURES • PROPERTIES

BAKELITE is your one source of more different types of resins for coatings. There is technical data available on all these resins, and for formulating variations of each resin to obtain coatings with different properties. Fourteen sales offices throughout the country can render prompt service wherever you are located. Personnel trained in the development of resins and formulations, and processing techniques, provide technical assistance.

TAKE ADVANTAGE OF ONE-SOURCE BUYING
For the greatest number of types of resins

- VINYL CHLORIDE-ACETATE RESINS • VINYL ACETATE RESINS
- VINYL CHLORIDE RESIN
- VINYL ALCOHOL-ACETATE RESIN SOLUTIONS
- VINYL ACETATE RESIN LATEX
- VINYL BUTYRAL RESINS • POLYETHYLENE RESINS
- 100% PHENOLIC-NON-HEAT HARDENING
- 100% PHENOLIC-HEAT HARDENING
- DISPERSIONS
- PHENOLIC "RESIN BAKING" RESINS AND SOLUTIONS
- POLYSTYRENE EMULSIONS
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HELPFUL FREE LITERATURE FOR YOU AND YOUR CUSTOMERS

In addition to data sheets and manuals there are booklets that can give you market ideas, and show your customers how coatings based on BAKELITE Resins protect structures and equipment in practically every industry. For information and literature write to Dept. BK-153

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RESINS for COATINGS

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NEWS

Newer Organic Pigments Discussed At N.Y. Meeting

A talk on "Vivid Light Fast Organic Pigments" was given by Vincent C. Vesce at the January meeting of the New York Paint and Varnish Production Club. Mr. Vesce is technical director in charge of research and development, of the Harmon Color division of the B.F. Goodrich Chemical Co.

V. C. Vesce

Mr. Vesce discussed the newer organic pigments with special reference to those which possess superior light fastness in pastel tints. The behavior of these colors on exposure were illustrated in colored slides. Objective data, derived from spectrophotometric measurements, were presented at the same time.

The behavior of colors in different paint systems and an evaluation of what constitutes "good light fastness" was presented. Emphasis was placed on the use of objective as well as subjective examination of exposure studies. The evaluation of the pigment system to be used was stressed rather than the pigment alone.

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2 New PICCO Warehouses

Pennsylvania Industrial Chemical Corp. has opened two new warehouses in California—one in Los Angeles, the other in San Francisco. The company also has announced that all warehouse activities on the Pacific West Coast will be directed by its district sales office at 3460 Wilshire Blvd., Suite 604, Los Angeles.

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New Company Elects

Hans Wyman was elected president of The Eleonora Chemical Corp., a newly formed subsidiary of The Pantasote Co., Passaic, N.J., and New York City. The company will produce polyvinyl chloride, vinyl film and sheeting.

KING SIZE: A 19,000 gallon tank car, which has proved to be more economical than installing a pipeline with pumps would have been, was put into operation recently by the Chemical Division of Union Bag & Paper Corp. The car, one of the largest ever registered, will transport Unitol crude tall oil. Car is shown at the company's Savannah, Ga. plant alongside of a standard 8,000 gallon tank car.

Dr. R. B. Akin of Du Pont Elected ACS Div. Chairman

Dr. Russell B. Akin of E. I. du Pont de Nemours & Co., Inc., Chicago, has been elected 1956 chairman of the American Chemical Society's Division of Paint, Plastics and Printing Ink Chemistry. Dr. Akin, who is district manager of plastics sales in Du Pont's polychemicals department, succeeds Dr. Albert C. Zettlemoyer of Lehigh University.

J. Kenneth Craver, section manager of special projects for the Monsanto Chemical Co., St. Louis, Mo., was chosen chairman-elect and Professor L. Reed Brantley, head of the department of chemistry at Occidental College, was named vice chairman. Dr. Allen L. Alexander, head of the Protective Coatings Branch of the Naval Research Laboratory, Washington, D. C., was re-elected secretary-treasurer.

Dr. Akin, 43, joined Du Pont as a research chemist in 1937, became a technical service representative in New York in 1941 and New Jersey sales representative in 1948. He was promoted to his present post last year.

He received the bachelor's degree from Brown University in 1933, the master's degree in 1935, and the Ph. D., as a Ferguson Fellow, in 1937 at Columbia University.

Dr. Akin is a member of the American Chemical Society, the Commercial Chemical Development Association, the Society of Plastics Engineers, the Society of the Plastics Industry, the American Association for the Advancement of Science, the American Institute of Chemical Engineers, the Institute of the Aeronautical Sciences and the New York Academy of Science.

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Surface Technology Course Offered At N.Y.U.

New York University College of Engineering is offering a Graduate Course in Surface Technology for the Spring Term. According to Prof. Max Kronstein, the course will be held Monday evenings from 7 to 9 o'clock at University Heights.

The course is listed as: Ch.E. 174-175. "Technology of Surface Finishes. A graduate level introduction and discussion of the principles and techniques of surface protection and decoration (metal structures, manufactured goods, pipelines, houses, concrete structures and fabrics), based on the principles of corrosion and deterioration of these units, the surface characteristics to be protected, and the chemical characteristics of the available compounds and materials. Discussion of production problems, methods of application and evaluation of the inorganic and organic coating materials."

NEWS

D.H. Moran, Reardon Pres., Re-Elected To NPVLA Post

David H. Moran, president of the Reardon Co., St. Louis, was re-elected to his third consecutive term as chairman of the executive committee of the National Paint, Varnish and Lacquer Association at the annual industry convention held recently in Washington D.C. His term of office runs through October, 1956.

D. H. Moran

Moran, who became Reardon president in 1947, has been active in paint industry affairs for many years. He was instrumental in the recent establishment of a program to train paint chemists at Missouri School of Mines, Rolla, Mo. During World War II he served as consultant on war plant camouflage to a number of U. S. and Canadian corporations, including Ford Motor Co. and General Motors. When the National Production Authority set up its Industry Advisory Committee during the Korean War, Moran was appointed to the committee.

The Reardon Co. manufactures waterbased paints and related products for building construction, maintenance and repair.

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R. J. Williams ACS Pres.-Elect

Professor Roger J. Williams of the University of Texas, discoverer of the growth-promoting vitamin pantothenic acid and a pioneer in the development of folic acid as a weapon against nutritional anemia, has been chosen president-elect of the American Chemical Society. Dr. Williams, who is director of the university's Biochemical Institute, will head the Society in 1957.

ACS president for 1956 is Dr. John C. Warner, president of the Carnegie Institute of Technology, who succeeds Professor Joel H. Hildebrand of the University of California.

Plans Set For Philippine Paint Company Operation

Final arrangements were completed at a recent meeting in San Francisco for the operation of a new paint factory now under construction near Manila in the Philippines.

A new company, known as the Fuller Paint Manufacturing Co. (Philippines) Inc., has been formed for the operation of the factory. It is a joint venture of W. P. Fuller & Co., Warner, Barnes & Co., Ltd. of Manila and Aboitiz & Co. of Cebu.

Colonel Frank Hodsoll, managing director of Warner, Barnes, attended the meeting to correlate production and distribution plans before leaving for the Phillippines.

Looking over the construction plans of the new Fuller factory in Manila are (l to r) Frank Foster, D. R. Garrett, Col. Frank Hodsoll, W. P. Fuller Brawner, and A. H. Brawner, Jr.

Representing Fuller were W. P. Fuller Brawner, vice president, D. R. Garrett, manager of the new company, Frank Foster, technical director of the Philippine factory and A. H. Brawner, Jr., advisor for the Fuller Export Department.

Construction of the plant, begun in October, is expected to be completed early this year.

"Trade Sales" Paints Topic Of College Conference

The Organic Coatings Research Laboratory of Case Institute of Technology will sponsor a conference on "Architectural and Maintenance Paints," January 25-27, to discuss the problems common to technical specialists responsible for the manufacture, purchasing, specifications, and use of household, or maintenance paints.

A "short-course" lecture program on recent trends and new developments in this class of paints, known in the industry as "trade sales," by specialists in their field will be used to stimulate the discussion sessions that will follow. All meetings will be held in Tomlinson Hall on the Case campus.

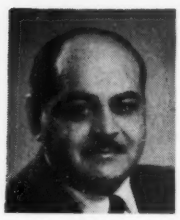
Tentative program topics include: "Interior Decorators' Paints —Types, Specification, and Special Uses," "Vapor Barriers—Theory and Practice," "Fire Retardant Paints," "Paints for Masonry," "Design Features of Home Construction with Reference to Paint Durability Problems," "New Developments in Oil-type House Paints," "New Hopes for Emulsion-type House Paints," and "Protection and Decoration of Structural Steel in Architectural Applications."

Copies of the final program and application blanks can be obtained by writing Dr. William von Fischer, Head, Department of Chemistry and Chemical Engineering, Case Institute of Technology, Cleveland 6, Ohio. Attendance will be limited and applications will be accepted in the order received. The registration fee, including dinner on Thursday evening, is $35.00.

NEWS

Form Jesse S. Young Co. To Act As Sales Managers

Formation of the Jesse S. Young Company, Inc., New York City, has recently been announced. The company will act as sales managers for leading manufacturers of chemicals and machinery for the paint, plastic, rubber, printing ink and allied industries.



J. S. Young

Among the concerns represented are Advance Solvents and Chemical Corp., Resyn Corp., Troy Engine and Machinery Co. and other well know manufacturers and distributors of chemicals and solvents.

Jesse S. Young, president of the corporation, has been well known in the paint, plastic, printing ink and allied industries for the past 18 years. He was formerly assistant to the president of Advance Solvents and Chemical Corp. and dealt with the sales and technical sales divisions of this company.

He has been active in the New York Paint, Varnish & Lacquer Association and a member of the program committee. He is also a member of the New York Printing Ink Production Club, the Salesmen's Association of the American Chemical Industry, Inc., the American Chemical Society, Northeast Section of the American Oil Chemists Society, New York, Washington, and Connecticut Rubber Groups, New York Pigment Club, Oil Trade Associations of New York and of New Jersey, New York Paint Travelers, Inc., Baltimore Paint and Varnish Production Club and the New England Paint, Varnish and Lacquer Association.

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A-D-M Moves Chi. Office

Archer-Daniels-Midland Co. has moved its Chicago sales office from 927 Blackhawk St. to 4761 W. Touhy Ave., Chicago 30.

BREAK GROUND: A new plant additon to Midland Industrial Finishes Co., Waukegan, Ill. will be the fourth addition to the original building occupied by the company when it first started fifteen years ago. Shown at ceremonies (l to r) are G. E. Batzel, vice president and general manager; E. O. Robson, president; and M. A. Glaser, chief chemist.

Use Of Research Labs Up 15% In Paint Industry

Use of scientific laboratories for research, quality and cost control, and new product development has increased more than 15 percent in the paint industry during the past five years, according to J. O. Bengston, president of the Chicago Apparatus Co., laboratory supply house. Bengston said the paint industry was one of the nation's leaders in recognizing the advantages of an industrial laboratory.

"Statistics of the laboratory supply industry show that both large and small companies are turning more and more to modern scientific methods of research and quality control," Bengston said. "Sales of laboratory apparatus have increased 233 percent for all industry and all purposes since 1946.

"The laboaratory supply industry has been growing at the rate of approximately eight percent each year, which is about three to five per cent ahead of the national product.

"The small or medium sized company has been greatly affected by this development. If such a company has no laboratory, and cannot regulate costs or quality, or develop new or better products, it is operating under a great competitive disadvantage," he said.

Bengston stated that both large and small companies engaged in the paint industry have been increasing their use of laboratories in recent years. Such quality control checks as spreading ability, drying time, and color fastness are vital functions in which the laboratory is essential, he explained.

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New Fire Retardant Paint May Aid Civil Defense

Fire retardant paints that slow down the rate of burning have been developed by the Corps of Engineers' Research and Development Laboratories, Fort Belvoir, Va. These paints could become a major aid in this country's civil defense program.

Containing certain pigments and oils which form a spongy insulating layer when subjected to heat, they feature all the esthetic and protective properties of good interior and exterior paints, according to Harvey Miller, a project engineer in the laboratories' materials branch.

Since the Army's needs are global, paints were evaluated in the Arctic, desert, tropics and at Fort Belvoir. Following six-month and one year exposures, they were returned to the laboratory and evaluated for residual fire retardancy. This was done by burning the test panels in a cabinet under controlled conditions and calculating the amount of weight loss and char volume.

The use of fire retardant paints does not stop fires, but it does aid materially in minimizing damage and loss of life.

NEWS

A. W. Everett, 61, Dies, Sherwin-Williams Veteran

A. W. Everett of Kansas City, southwestern regional director for The Sherwin-Williams Co., died in late November. He was 61 years old.

A. W. Everett

Mr. Everett joined Sherwin-Williams in 1917 as a stockkeeper in the Fort Worth branch. Three years later he was appointed sales representative there, and in 1921 was named manager of the company's Wichita Falls Branch.

In 1923 he was transferred to Tulsa, Okla., as assistant manager of the Oklahoma division. Two years later he became sales manager of that division.

From 1931 to 1935 he served as manager of petroleum and industrial sales in Oklahoma. From Tulsa, Mr. Everett moved to Kansas City to fill the post of manager of the southwestern district. He became regional director when that district was expanded to a sales region covering a 14-state area extending from Utah to Tennessee.

During his 38-year career with Sherwin-Williams, Mr. Everett became one of the best-known paint executives in the Middle West. He was active in the Lions and Kiwanis Clubs, and was a member of the Kansas City Chamber of Commerce and the Kansas City Club. Surviving is his widow, Grace.

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Simultaneous Color Spray

A new, vari-color coating product, named "Glid-Tex," which permits three, different colored paints to be sprayed simultaneously from a single spray gun has been developed for professional home builders and painting contractors, it was announced by A. D. Duncan, vice president of The Glidden Co. and general manager of the firm's paint division.

SALES CONFERENCE: Vulcan Steel Container Co., Birmingham, Ala. recently held a conference to discuss its growth and progress. G. D. Zuck, pres. is shown at head of table, right.

Hercules Establishes Two New Sales Offices

Two new sales offices, at Detroit and Minneapolis, have been established by the synthetics department of Hercules Powder Co. At the same time, the department's Houston office was designated as a district sales office.

The Detroit office will be in the Fisher Building. Eugene S. Massey has been named resident technical representative.

The other office, in Minneapolis, will be in Suite 587, Northwestern Bank Building, 620 Marquette Ave. It has been designated as a sub-office under the Chicago district, and Bruce J. Hall has been named resident technical representative.

The Houston office, with Henry J. Heiser as district manager, services, New Mexico, Texas, Louisiana, Mississippi, parts of Arkansas, Florida, and Oklahoma. Mr. Heiser has been acting as resident technical service representative.

•

Instrument Short Course

The Fifth Annual Instrument Short Course will be held January 26-27 at Los Angeles Harbor Junior College, Wilmington, Calif. It is co-sponsored by the Southern California Meter Association and Los Angeles Harbor Junior College.

The course covers all phases of instrumentation, serving as a refresher course for engineers on basic instrument principles, as well as an opportunity to keep pace with the rapidly advancing technology in the field of instrumentation and automation.

Plant Maintenance Show To Feature 5,000 Items

Five thousand different pieces of equipment, products and services, valued at $4,000,000, to help American industry maintain its productive capacity, will go on display January 23, when the four-day Plant Maintenance & Engineering Show opens at Convention Hall, Philadelphia.

The show will be accompanied by a three-day conference at which 26 aspects of factory upkeep will be discussed. Clapp & Poliak, Inc., New York exposition management firm, produce both events.

The show will have more than 400 exhibiting companies. The exhibit area will cover 100,000 square feet and exhibits will cover 278 basic types of equipment, products and services.

•

Three Changes At Atlas

Retirement of two directors and election of a new board member have been announced by Atlas Powder Co.

Retiring are Charles Warner, a director since 1927, and Cecil F. Backus, a director since 1929. The new director is Wilfred D. Gillen, president of The Bell Telephone Co. of Pennsylvania, and The Diamond State Telephone Co.

•

Hold "Ed Falsig Night"

The November meeting of the C.D.I.C. Club, meeting in Dayton, Ohio, was designated "Ed Fasig Night." President William L. Foy presented Mr. Fasig with a silver pen and pencil set as a token of the club's appreciation for his work.

NEW MATERIALS & EQUIPMENT

A MONTHLY MARKET SURVEY

This section is intended to keep our readers informed of new materials and equipment. While every effort is made to include only reputable products, their presence here does not constitute an official endorsement.

AMERICAN CAN

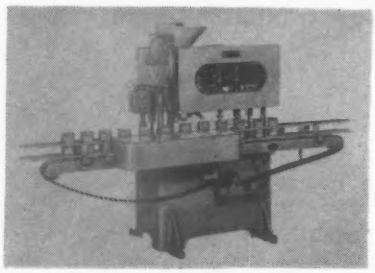
OBLONG CAN
For Wide Range Of Liquids

A modern I-Style, oblong can designed for packaging a wide range of liquids, is said to be the first solderless oblong can on the market.

Among the unique features claimed are a clinched nozzle, which prevents corrosion and flux splashes, and allows a lithographed top; a no-drip spout with outward curl on the neck that eliminates the sharp inside edges; enameled inside providing 100 percent protection; compact stackability; cemented side seam, permitting lithography all around the can. American Can Co., 100 Park Ave., New York City, N.Y.

STYRENATED ALKYD
Non-Yellowing

"Chempol S-2200" is a styrenated alkyd said to have superior non-yellowing characteristics on a bake, and excellent flexibility and impact resistance. Freeman Chemical Corp., Saukville, Wis.



GENERAL CORRUGATED

SINGLE STRIP TAPE SEALER
For Containers

Manufacturer claims that machine automatically tapes 25 or more cases per minute, single-strip, top and/or bottom flaps only, plus end panels, as required. Machine has minimum length of 7 feet. Advantages of tape sealing, according to company are assurance of safe delivery, convenient opening with no damage to container contents or person, and dust and pilferproof features. General Corrugated Machinery Co., Palisades Park, N.J.

NON-OXIDIZING ALKYD
Improved Color & Gloss Retention

"Duraplex ND-76", a non-oxidizing alkyd resin, is said to offer marked improvement in color and gloss retention at high baking schedules or service temperatures.

Manufacturer claims the following properties for product: Outstanding color and color retention in white baking enamels; excellent gloss and gloss retention; excellent hardness and mar resistance; and very high alkali and soap resistance.

Company says that product is compatible with urea, melamine, and triazine resins used in baking enamels; in all proportions with half-second nitrocellulose; silicone resins; silicone alkyds; and epoxies; and in limited amounts with cellulose acetate butyrate and certain silicone resins. Rohm & Haas Co., Resinous Products Div., Washington Sq., Philadelphia 5, Pa.

SILICONE ADDITIVE
For Hammer Finish

F-4290, a silicone finish additive for conventional metallic paints, is said to be effective in concentrations as low as 0.1 to 1.0% by weight. The addition of 0.1% to such paints produces a hammer finish which contrasts with the appearance of the original paint in the same manner as the right hand panel compares to the left, according to the company.

DOW CORNING

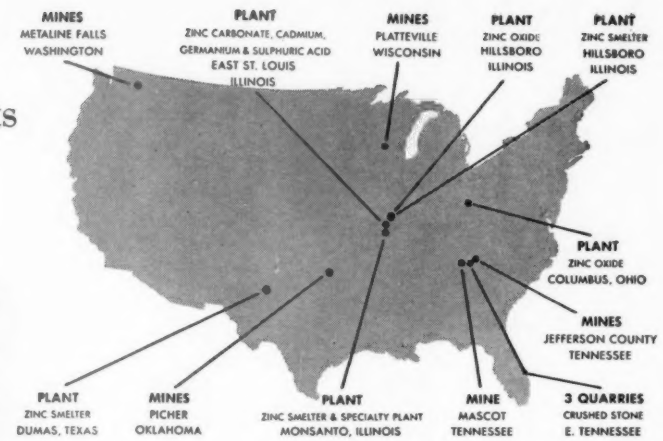
Varying the concentration of product is said to produce a variety of hammer effects, ranging from coarse to fine. Shelf life is excellent, with no stirring or mixing required before use, according to company.

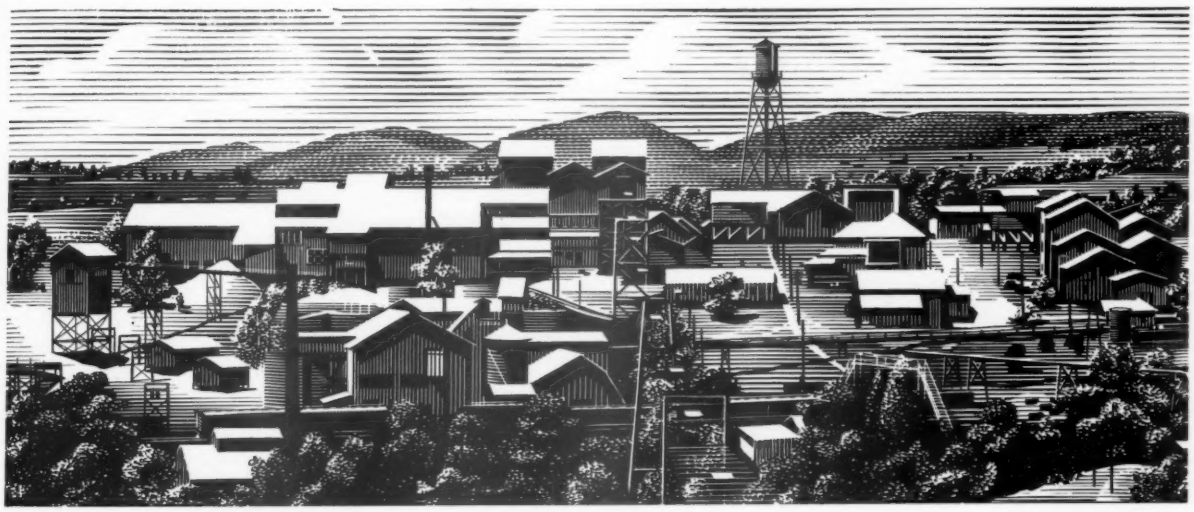
A solution of silicone polymer in xylene, product is claimed effective in drying type alkyds; epoxies; soya alkyd-melamine; coconut alkyd-melamine; silicones and modified silicones; and acrylic, nitrocellulose or ethyl cellulose lacquers. Dow Corning Corp., Midland, Mich.

STABILIZING PLASTICIZER
Epoxy Type

"Estynox 308," a stabilizing-plasticizer of the epoxy type now available in pilot plant quantities, is said to be distinguished from ordinary epoxidized oils by marked solubility in alcohols, higher vis-

American Zinc and its products *from* A *to* Z





CONCENTRATING MILL,
MASCOT, TENNESSEE

One of the key factors in American Zinc's widespread mining and milling operations. In Tennessee, American Zinc also owns and operates mines in Jefferson County. It is here that one of the largest known reserves of zinc in the United States is found (in excess of 1,250,000 tons of recoverable zinc, proven, with additional large reserves indicated). Other company-owned and operated mining properties are located at Platteville District, Southern Wisconsin; Metaline Falls District, Eastern Washington; and Picher field of the Tri-State Area (Missouri-Kansas-Oklahoma). For the complete picture, see map above.

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ZINC ANODES (Plating & Galvanic)
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VITREOUS PORCELAIN *Grinding Balls*

MADE FROM A SPECIALLY DEVELOPED BODY FOR...

Long Wear

McDanel Ceramic Grinding Balls are fired over a long period of time at controlled temperatures, assuring complete vitrification. This care in manufacturing has given them an impressive history of long wear and dependable grinding.

Purity

McDanel Ceramic Grinding Balls, sold since 1919, have been the standard in ball mill operations where purity is of prime importance. They are manufactured with exacting control, assuring uniform content and pick up, lot after lot.

Better Impact Resistance

It is the specially developed body which gives McDanel Ceramic Grinding Balls their excellent impact resistance. After firing, a slow, thorough cooling process prevents any strains being set up. It is this almost complete absence of cooling strain which prevents chipping or cracking.

Uniform Grinding

Naturally, uniformity is of prime importance in any grinding operation . . . both in grinding media and end result. McDanel Ceramic Grinding Balls are hand rolled with no seams to break or chip.

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McDANEL Industrial PORCELAINS

McDANEL

REFRACTORY PORCELAIN COMPANY

BEAVER FALLS · PENNSYLVANIA

cosity, and greater resistance to gasolines, aliphatic solvents and oils, due to an acetoxy modification of its structure.

It stabilizes such polymers as nitrocellulose, ethylcellulose, cellulose acetate butyrate, polyvinyl chloride, and chlorinated and synthetic rubbers, against heat and ultraviolet light, according to the company.

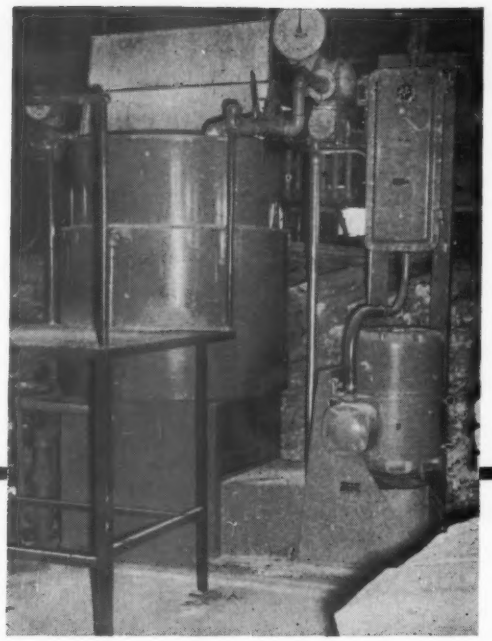
In nitrocellulose lacquers, product, at low concentrations, produces hard, tough, non-yellowing films, and is claimed particularly suitable for water-white lacquers, automotive finishes, printing inks and similar quality products. Baker Castor Oil Co., Sales Promotion Dept., 120 Broadway, New York 5, N.Y.

NORCROSS

VISCOSITY CONTROLLER
Operated Pneumatically

A pneumatic-operated viscosity controller, Model M8C uses an air-operated measuring element, Model M8, with a control station, Model C, and necessary valves to provide automatic control.

Company says the process control is particularly suitable for applications where solvent must be added to correct for evaporation losses, such as in paint finishing, sizing and various coating processes, providing automatic control of viscosity at a low cost. Norcross Corp., Dept. #N47, Newton 58, Mass.



Abbé Dispersall Mixer for Latex Paints at the Illinois Paint Works, Chicago, Ill.

"We Use the Abbé Dispersall Mixer Exclusively

to Mix Our Deep-Tone Latex Paints"

At a large paint works in Chicago, all latex paints are mixed in an Abbé Dispersall Mixer. They say that there is "an economical advantage in running latex in the Dispersall as against a roller mill." They also tell us that the particular advantage in the use of the Dispersall is "the ease of clean-up, giving us flexibility in changing from one color to another."

Investigate the Abbé Dispersall Mixer

...if you are interested in

- Complete Dispersion of All Ingredients, Regardless of Formulation
- Greatly Reduced Mixing Time
- Maximum Color Values from a Minimum of Color
- Doing the Entire Range of Colors in ONE Machine
- Filling Directly from the Mixer (or Pump) to Storage

WRITE FOR FULL INFORMATION

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50 Church Street • New York 7, N. Y.
Address Department 64

NEW
MATERIALS — EQUIPMENT

PACKAGING UNIT
For Liquid Or Viscous Substances

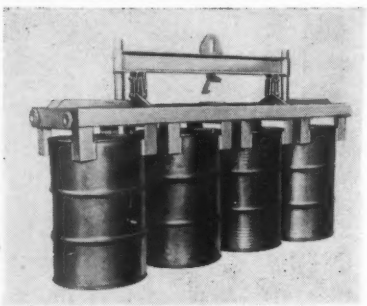
A packaging unit, designed as a one-time use dispenser for any liquid or viscous substance, is made of thin wall extruded Saran. It is a slender, transparent, pliable tube sealed at the top with a specially prepared compound. When tube is firmly squeezed, seal breaks open and contents of dispenser are automatically expelled.

Services of the company include packaging client's products in dispensers and then bulk shipping them to their appointed destination. Fill volume can be controlled up to 0.01 of a c.c. and can be manufactured in any size to hold whatever amount of a product desired. They are highly impermeable to water vapor and are resistant to and unaffected by most chemicals, according to the company. Unette Corp., 280 Madison Ave., New York City, N.Y.

UNETTE

VERTICAL DRUM GRAB
Automatic Type

Manufacturer says that drums can now be handled three to six at a time for fast, easy stacking with the Downs Automatic Vertical Drum Grab. An automatic device is said to permit the operator to accomplish all loading and unloading of the grab by merely raising and lowering the hoist line. Drums need not be specially spaced for automatic pick-up—only reasonably in line to facilitate placing the grab on the drums for the lift, according to the company.



DOWNS

The drum grab is designed to handle standard 55 gallon drums with a uniform shell or body diameter of 22½ inches. If dimensions should vary from this size, grabs for special sizes can be supplied. Downs Crane & Hoist Co., 540 W. Vernon Ave., Los Angeles 37, Calif.

IMPROVED PE
Gives Better Color

Improved Technical PE is a mixture of about 88% mono-PE and about 12% di-PE. This ratio remains at the same general level that has characterized the company's PE heretofore. Laboratory tests and 15-gallon scale pilot plant tests indicate reaction speeds of both grades, as measured by rate of viscosity increase in alkyds, are essentially the same, according to the company.

Company says that the most striking characteristic developed in alkyd processing tests of Improved Technical PE is that alkyd colors are as pale as colors resulting from

New LOW Prices . . . See Your Colton Salesman

The "Sellingest" Paints are those offering the 6 Big Benefits of VINAC FLEXBOND 800

AN AIR REDUCTION PRODUCT

Copolymer Polyvinyl Acetate

Include Vinac FLEXBOND 800 in all your water base paints and watch your sales climb. The reason? Vinac FLEXBOND 800 Paint Vehicle adds these six distinct advantages:

1. SCRUB RESISTANT — Unequalled for wet scrub and adhesion
2. FILM INTEGRITY — Maintained even at low temperatures
3. PERMANENTLY FLEXIBLE — A resultant natural property of copolymerization
4. WATER RESISTANT — Fast-acting—as soon as dry
5. IT BREATHES — Avoids blistering and peeling by allowing moisture to pass through
6. ODOR-FREE

Is it any wonder that paints made with Vinac FLEXBOND 800 Copolymer Polyvinyl Acetate are *superior* paints . . . Push your paints up front with FLEXBOND 800.

Colton technical assistance, without obligation, is always available. Write now for free sample of Vinac FLEXBOND 800, data sheets, specifications and suggested formulations. Address Dept. F-3.

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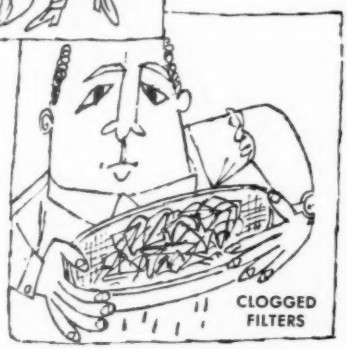
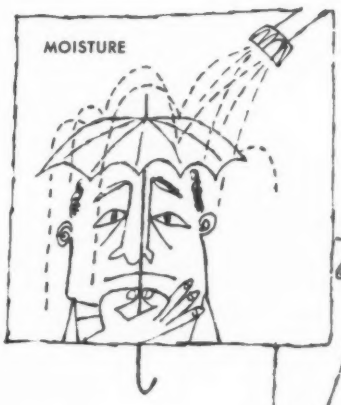
Products of other divisions of Air Reduction Co., Inc. include: AIRCO—industrial gases, welding and cutting equipment • PURECO—carbon dioxide, liquid-solid ("DRY-ICE") • OHIO—medical gases and hospital equipment • NATIONAL CARBIDE—pipeline acetylene and calcium carbide.

these paintmaking problems are pushovers





thanks to CO_2 by Liquid Carbonic

FREE BULLETIN

Gives complete details on the uses above plus other important CO_2 applications in the paint and varnish industry. Send for your copy of "The Use of CO_2 in Paint, Varnish and other Alkyd-Type Resin Manufacturing."

Flash Fires?

An inert, heavier-than-air "blanket" of CO_2 gas effectively displaces oxygen, eliminates possibility of fire or explosion.

Moisture?

Forced up through the cooking reaction mixture, bubbles of CO_2 literally "sweep" out water vapor as it is formed. Result: faster reactions, improved product.

Skinning?

By displacing oxidation-causing air, CO_2 prevents the formation of "skin" in thinning tanks, storage tanks, shipping containers and pipes.

Clogged Filters?

CO_2 purging cleans filters in a fraction of conventional cleaning time. In addition, CO_2-cleaned filters last far longer between cleanouts, aid oil recovery.

World's Largest Producer of CO_2

THE LIQUID CARBONIC CORPORATION

3128 South Kedzie Avenue
Chicago 23, Illinois

the use of highly-purified mono-PE.

In using litharge as alcoholysis catalyst, Improved PE with metallic impurities removed, is said to eliminate the catalyst haze found with PE's containing alkaline-earth metal formates. Hercules Powder Co., Wilmington 99, Del.

ANTI-SKINNING AGENT
For Latex

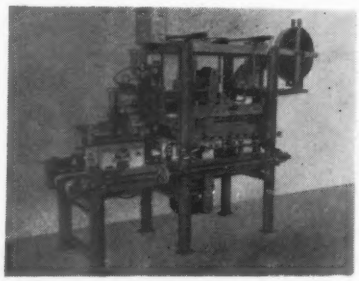
"Unapex," claimed to simplify latex paint making, is said to combine in one paste all necessary ingredients for a high quality latex paint but the latex itself and pigments. Company says that all the paint manufacturer need do is grind into this paste the necessary pigments and thin with latex to produce a finished latex paint without additional equipment or raw materials.

"Nilskin No. 2" is said to be a radically different anti-skinning agent. Company says that it is a substantially odorless product in freely soluble paste form with no volatile matter present. Naftone, Inc., 515 Madison Ave., New York 22, N.Y.

PLASTICIZER
Low Temperature

"Elastex" 20-A plasticizer (diisodecyl adipate), is said to give vinyl formulations excellent performance at low temperatures, and also provide relatively low volatility and good resistance to heat degradation.

Furthermore, the plasticizer is of such low color that it may be used in the manufacture of transparent vinyl products, according to the company. Product is furnished with an added concentration of antioxidant that is considered suitable for most service requirements. However proportion of additive may be adjusted or eliminated entirely. Barrett Division, Allied Chemical & Dye Corp., 40 Rector St., New York 6, N.Y.



RESINA

CAN SEALER
Works Automatically

Company calls this the first and only automatic can sealer of its type for use in the edible oil industries. No time is lost in handling the containers, it is claimed, as they go right into the sealer direct from the filling machine, untouched by human hands.

Sealer is said to be ideal for both large and small plants, for continuous or short runs. It seals cans using the standard one inch seal. Larger seal models are also available. Change over from one size container to another can be made in just a few minutes. Speed is 60 cans per minute, up to quart size, slower on gallon cans.

Unit weighs approximately 1500 pounds. Overall height is seven feet maximum; conveyor height is 33 inches minimum. Machine has ½ and ⅓ hp. motors. Resina Automatic Machinery Co., Inc., 572 Smith St., Brooklyn 31, N.Y.

CORRECTION

In last month's issue the address of the manufacturer of the portable model Elgin rotary paint filler should have been Elgin Manufacturing Co., Elgin, Ill.

LESS THAN
1¢
A GALLON
That's all it costs to remove the odor from your paint with Maskit #2
• Makes your paint more acceptable to painters and home owners.
• Masks the odor in the can and while paint is being applied . . . as well as during – and after – the drying period.
• Does not affect drying time or color durability.
• Amazingly economical . . . use 1 lb. of Maskit #2 to 150 gallons of paint.
MASKIT #2 is equally effective in paints, lacquer thinners, varnishes and other similar types of products. Order a trial pound today!
$1.50 lb.
AROMATIC PRODUCTS, INCORPORATED
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CHICAGO • DALLAS • MEMPHIS • PITTSBURGH • LOS ANGELES • BOSTON

NEWS

Merck Activates Large Formaldehyde Plant

A formaldehyde plant which may well be the largest in the world, is being activated by Merck & Co., Inc., chemical division, according to William H. McLean, division president.

This existing production unit at the company's Cherokee Plant, Danville, Pa., has 15 separate production lines each with an annual capacity of several million pounds. Production has already begun and output is now freely available, according to Dr. McLean.

Merck will offer initially Formaldehyde 37% Low Methanol (Uninhibited) and Formaldehyde 37% Inhibited (U.S.P.) in tank car and tank truck quantities, as well as Hexamine Technical Powder and Hexamine Technical Granular in bags and drums.

Since supplies of formaldehyde from currently operating plants may be short this year if business conditions remain at last year's levels, and since consumption is expected to increase in subsequent years, operation of the Merck plant is expected to contribute substantially to its availability.

•

M-CO Paint Building Plant

The M-CO Paint Processing Machine Co., formerly the Epworth Mfg. Co. of Detroit has started construction of a new $100,000 plant in South Haven, Detroit, according to an announcement from C. W. Zink, president. Construction is expected to be completed in April.

•

To Sell Gov't Hog Bristles

The General Services Administration has announced that on and after June 4 it will offer for public sale 2,000,000 pounds of Chinese hog bristles now held in the national stockpile of strategic and critical materials.

Hog bristles are used principally in production of high quality paint and varnish brushes.

PATENTS

Complete copies of any patents or trade-mark registration reported below may be obtained by sending 50c for each copy desired (to foreign countries $1.00 per copy) to the publisher.

Alkyd-Silicone Coating

U. S. Patent 2,724,704. Ronald L. Millar, Chicago, Ill., assignor to The Glidden Company, Cleveland, Ohio, a corporation of Ohio.

A coating composition particularly adapted to yield baked films having an appearance simulating hammered metal and adapted to endure prolonged service at moderately elevated temperatures, said composition comprising a vehicle composed essentially of an aromatic hydrocarbon solvent solution of a cobodied inter-reaction product of (A) between 20 and 80 parts of an alkyd resin (1) which is free of non-benzenoid unsaturation between carbons in the polycarboxylic acid and polyhydric alcohol radicals thereof, (2) which has been modified molecularly with fatty acids of at least one glyceride oil selected from the class consisting of drying and semi-drying oils, the amount of fatty acids being equivalent to an oil content of between about 40% and 70% by weight of the modified alkyd resin, and (3) which has been modified in its fatty acid portions with at least one compound selected from the group consisting of styrene, α-methyl styrene and vinyl toluene in an amount between about 40% and 60% by weight of the fatty acid modified alkyd resin with (B) between 80 and 20 parts of a siloxanol which is characterized (1) by having its silicon atoms bonded together by Si—O—Si linkages, (2) by having the remaining valences of its silicon atoms satisfied by methyl, phenyl and hydroxyl groups, (3) by having an average total of between about 1 and 1.7 methyl and phenyl groups per silicon atom with between 10% and 90% of the total phenyl and methyl groups being phenyl groups, (4) by having an hydroxyl content of between about 0.45% and 20% by weight of the siloxanol solids, and (5) by being soluble in aromatic hydrocarbon solvent, said inter-reaction product having been produced by cobodying the alkyd resin with said siloxanol under reflux conditions in an aromatic hydrocarbon solvent with removal of liberated water of reaction until a substantial increase in viscosity short of gelation had been secured.

Meeting your
Requirements
WITCOBLAK®
Superior pigment blacks
No. 32, No. 50, No. 100,
Hitone, F-1, F-2, and F-3
Literature and samples on request
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'36 Years of Growth
WITCO CHEMICAL COMPANY
CONTINENTAL CARBON COMPANY
122 East 42nd Street, New York 17, N. Y.
Chicago • Boston • Akron • Atlanta • Houston
Amarillo • Los Angeles • San Francisco • London and Manchester, England

Coated Titanium Dioxide Pigment

U. S. Patent 2,721,853. John W. Eastes, Somerville, and Theodore F. Cooke, Martinsville, N.. J., assignors to American Cyanamid Company, New York, N. Y., a corporation of Maine.

As a new and useful composition of matter, titanium dioxide pigment particles bearing a coating consisting essentially of the thermocured water-insoluble, hydrophobic, organophilic resinous reaction product of an alkylated methylol melamine and a saturated alkylamide having a chain length of from 10 to 20 carbon atoms, and having a N-alkylol substituent containing fewer than 4 carbon atoms, the number of carbon atoms in each alkyl group of said alkylated methylol melamine being not more than 4, the weight of said alkylated methylol melamine to said amide being between about 1:5 and 2:1, and the weight of said coating being between 0.5% and 10% of the weight of the titanium dioxide.

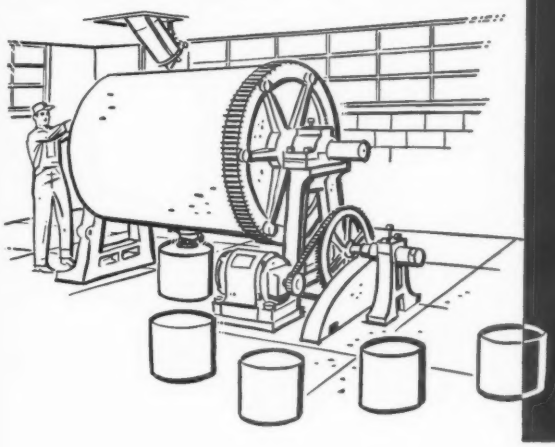
Cleaning and Coating Solutions For Metallic Surfaces

U. S. Patent 2,724,668. William S. Russell, Royal Oak, Mich., assignor to Parker Rust Proof Company, Detroit, Mich., a corporation of Michigan.

A composition of matter for forming by spraying, a phosphate coating on metallic surfaces which consists essentially of an aqueous alkali metal phosphate solution containing an oxidizing agent, and .01% to 2% of an alkali metal lignosulfonate, said solution having a pH of 4.2 to 6.0

HARSHAW DRIERS

Comply with the Strict Tolerances Needed for Highest Quality



Harshaw's precise manufacturing specifications demand the following tests for every batch of driers produced:

- Metal content
- Specific gravity
- Color
- Viscosity
- Total solids content
- Flash point (TCC)
- Moisture content
- Acid value
- Miscibility with raw linseed oil
- Miscibility with mineral spirits
- Benzene insoluble content
- Customer's specified tests

Order your next requirement of driers from Harshaw. They are produced and tested at our plant in Gloucester City, N. J. where we have the most modern facilities available. Harshaw Driers are distributed nation-wide through 18 stock points.

TYPICAL HARSHAW DRIERS

LIQUID DRIERS

- Uversol (Naphthenate) Liquids
- Linoresinate Liquids
- Linoleate Liquids
- Lithos
- Octasols
- Pastes
- Pastalls

SOLID DRIERS

- Uversol (Naphthenate) Solids
- Linoresinate Solids
- Linoleate Solids
- Soyate Solids
- Fused Resinates

POWDERED DRIERS

- Precipitated Resinates
- Drying Salts:
  - Cobalt
  - Lead
  - Manganese
  - Zinc

THE HARSHAW CHEMICAL CO.
1945 East 97th Street, Cleveland 6, Ohio
BRANCHES IN PRINCIPAL CITIES

Producing Coloring Pigment

U.S. Patent 2,722,485 . . Otto Jensen, Kansas City, Mo., and William T. Walton, Chicago, Ill., assignors to Seidlitz Paint and Varnish Company, Kansas City, Mo., a corporation of Missouri.

The method of preparing a color base for use in tinting paints which consists of a finely divided homogeneous mixture of a water-insoluble resin and a pigment consisting of the steps of adding a pigment filter cake consisting of a mixture of pigment and water to a solution of a water-insoluble resin in a water-soluble organic solvent, slowly agitating the mass thus obtained to transfer the pigment from said pigment-water mixture into said resin solution and disperse said pigment homogeneously throughout said resin solution, adding water to said mass in the amount of about five volumes of water to one volume of said resin solution, turbulently agitating said water-diluted mass to extract said solvent from said resin solution and produce a slurry consisting essentially of a homogeneous mixture of said resin and pigment, removing said slurry from said water-diluted mass to produce a body of finely divided particles of pigmented resin, drying said body of particles and sifting said particles to produce a pigmented resin powder.

Modified Polyester Resin

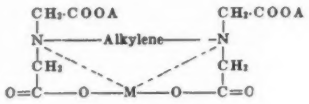
U. S. Patent 2,724,705. Robert S. Glover, Jr., Huntington Woods, Mich., assignor to Hercules Powder Company, Wilmington, Del., a corporation of Delaware.

A polymerizable composition comprising about 30-70% polymerizable unsaturated polyester of a polyhydric alcohol and a polycarboxylic acid, about 70-30% polymerizable ethylenically unsaturated monomeric compound capable of copolymerizing with said polyester and about 1-40% substantially petroleum hydrocarbon-insoluble pine wood resin by weight.

Heat And Light Stable Vinyl Resin

U.S. Patent 2,724,706 . . Frederick C. Bersworth, Framingham Center, Mass., assignor to The Dow Chemical Company, Midland Mich., a corporation of Delaware.

A composition comprising a vinyl chloride-containing resin blended with a chelate compound of metal from the group consisting of lead, cadmium, tin and zinc and an alkylene polyamine polyacetic acid, said chelate compound conforming to the composition wherein



U. S. Patent 2, 724, 706

M is one of the said metals, alkylene is a low molecular weight alkylene group and A is one of the group consisting of alkali metals and alkaline earth metals.

Wood Stains With A Flavanone Azo Dye And Brightener

U.S. Patent 2,723,898 . . Harry A. Toulmin, Jr., Dayton, Ohio, assignor to Chadeloid Corporation, Dayton, Ohio.

A wood staining composition comprising an azo dye in which the coupling component is chosen from the group consisting of naringenin, hesperetin, and eriodictyol, said composition containing water and a brightening agent.

NOPCO offers 6 different ANTI-FOAMERS

. . . to make sure there's no foam in your latex paint

You simply can't rely on one anti-foamer to prevent costly foam in each different latex paint system—or in each plant.

Nopco's paint specialists, the first to concentrate on latex paints, today can completely eliminate foam from your latex paint, with an anti-foamer carefully selected for your plant, your system, your working conditions. Why not write them today?

Nopco Chemical Company,
546 Industrial Street, Harrison,
New Jersey.

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PLANTS: Harrison, N. J.
Cedartown, Ga. • Richmond, Calif.
London, Ont. Canada

One of these will make your latex paint foam-free
FOR BUTADIENE-STYRENE SYSTEMS Nopco 1407, Nopco 1497-V, Nopco 1907-B
FOR ACRYLIC RESIN SYSTEMS Nopco 1497-V, Nopco JMK
FOR POLYVINYL-ACETATE SYSTEMS Nopco JMY, Nopco JMU , Nopco JMK

LANCASTER, ALLWINE & ROMMEL
REGISTERED PATENT ATTORNEYS

•

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Booklet and form "Evidence of Conception" forwarded upon request.

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(Ethylene and Diethylene Glycol Ethers)

Can you use the high solvent power of Dow's new Dowanols? Can you benefit from the prevention of blush or orange peel. . .from the better flow-out and adhesion Dowanols impart to lacquers, inks, enamels, and varnishes. . .from increased penetration given to dyes. They are effective as mutual solvents and coupling agents for mixtures containing water and water-insoluble organic chemicals.

Caption	Dowanol 7	Dowanol 8	Dowanol 10	Dowanol 16	Dowanol 17	Dowanol 19
Chemical Name	Ethylene Glycol Methyl Ether	Ethylene Glycol Ethyl Ether	Ethylene Glycol n-Butyl Ether	Diethylene Glycol Methyl Ether	Diethylene Glycol Ethyl Ether	Diethylene Glycol n-Butyl Ether
Specific Gravity @25/25°C.	0.963	0.9275	0.899	1.018	0.9855	0.952
Boiling Range 5-95% @760m.m.Hg °C °F	123-126 254-258	133-136 271-277	166-173 330-343	189-195 372-383	197-203 387-397	225-233 437-450
Viscosity CPS @25°C	1.532	1.838	2.83	3.467	3.780	4.92
Flash Point °F (COC)	125	110	160	210	205	225
Dilution Ratio: Toluol L.D Naphtha	4.0 0.3	5.2 1.1	3.3 1.8	2.3	1.9 0.2	
Solubility	All Dowanols infinitely soluble in water and practically all commercially available solvents					

For further information and samples, call your nearby Solvents and Chemicals bulk plant.

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NEWS

Reichhold Negotiating For New Plant Site

Negotiations are currently in progress for the purchase by Reichhold Chemicals, Inc., of a thirty acre site for a second Pacific Northwest plant in the Tacoma, Washington, Tide-flat area, it was announced by Henry H. Reichhold, general manager.

RCI has been conferring with the Tacoma Port Commission relative to purchase of the land.

The need for expansion of production in the area, now concentrated at RCI's Seattle plant, dictated acquisition of the site in Tacoma, Mr. Reichhold said. A modern, dry adhesive processing plant and warehouse embodying all the new developments in engineering and materials handling will be built. Concurrently, a greatly enlarged pentachlorophenol and muriatic acid plant will be built as will modern control laboratories.

This will be the 13th U. S. plant for RCI and its 35th throughout the world.

NOW...

get low-cost filtration of all grinds down to number 4

Paint and varnish men will welcome this new addition to the MICRO-KLEAN line. It's a 70-micron cartridge, extending the range of low-cost MICRO-KLEAN filtration down to number 4 grind.

Here's what MICRO-KLEAN does for you:

- gives positive removal of all over-size pigments and contaminants
- provides greater filter capacity for uninterrupted running of larger batches
- handles #4 grind and finer, removing seeds and particles not touched by a centrifuge

Find out today how the economical, easily-installed MICRO-KLEAN can save you money. Write to Cuno Engineering Corp., 18-1 South Vine Street Meriden, Conn. 4.17

CUNO ENGINEERED FILTRATION

Gen. Ultrasonics Appoints Engineering, Sales Reps

The General Ultrasonics Co. of Hartford, Conn. has announced the appointment of engineering and sales representatives to cover the New England area for the application of the firm's ultrasonic processing equipment in the fields of electroplating, cleaning, pickling and for research and development purposes.

Connecticut will be the responsibility of The MacDermid Sales and Equipment Corp. of Bristol, Conn.

Massachusetts, Rhode Island, New Hampshire, Vermont and Maine will be covered by Louis V. Gagnon who has established quarters at Framingham, Mass.

•

Glidden To Build New Florida Chemical Plant

A new multi-million-dollar chemical plant will be constructed by the Glidden Co. at Port St. Joe, Fla., to utilize the crude soap skimmings created as a by-product by the St. Joe Paper Co. and other southern kraft paper mills.

Announcement of the construction plans was made by Paul E. Sprague, Glidden vice president and general manager of the company's southern chemical division.

Mr. Sprague said the new unit will produce crude and distilled tall oil, high grade fatty acids, premium grade tall oil rosins and by-product pitch. The plant will be located adjacent to the St. Joe Paper Company's kraft mill and will be designed to handle 50,000 tons annually of the by-product soap skimmings.

•

Cyanamid To Buy Formica

American Cyanamid Co. and The Formica Co. announced that negotiations are in progress whereby Cyanamid, one of the nation's leading chemical companies, will acquire the business and assets of Formica, producer of laminated plastics.

When the acquisition takes place, it is contemplated that Formica will continue to operate under the direction of its present management as an additional unit in the Cyanamid organization.

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TITANOX®

The white coating on these venetian blinds was pigmented with TITANOX-RA—the rutile "pure" titanium dioxide white pigment. Because of its maximum hiding power, TITANOX-RA is especially useful in flexible thin films, on metallic surfaces. On products that must withstand bending or forming—containers, collapsible tubes, etc.—TITANOX-RA is your No. 1 choice in white pigments. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; Atlanta 5; Boston 6; Chicago 3; Cleveland 15; Houston 2; Los Angeles 22; Philadelphia 3: Pittsburgh 12; Portland 14, Ore.; San Francisco 7.
In Canada: Canadian Titanium Pigments Limited, Montreal 2; Toronto 1.

3786-A

PERSONNEL CHANGES

DIAMOND ALKALI: Walter R. Roberts, for 20 years manager of silicate sales, has retired. Succeeding him is **Clifford S. Hancock,** manager of calcium carbonate sales.

GENERAL ELECTRIC: John T. Castles has been appointed manager of the elastomer market development unit in the Silicone Products Department.

Gent

Kimberly

AMERICAN ZINC INSTITUTE

AMERICAN ZINC INSTITUTE: Ernest V. Gent, who has served the institute for 20 years first as secretary then as executive vice president, has retired. New vice president is **John L. Kimberley,** now secretary of the institute.

van Ameringen

Walker

vAN AMERINGEN-HAEBLER

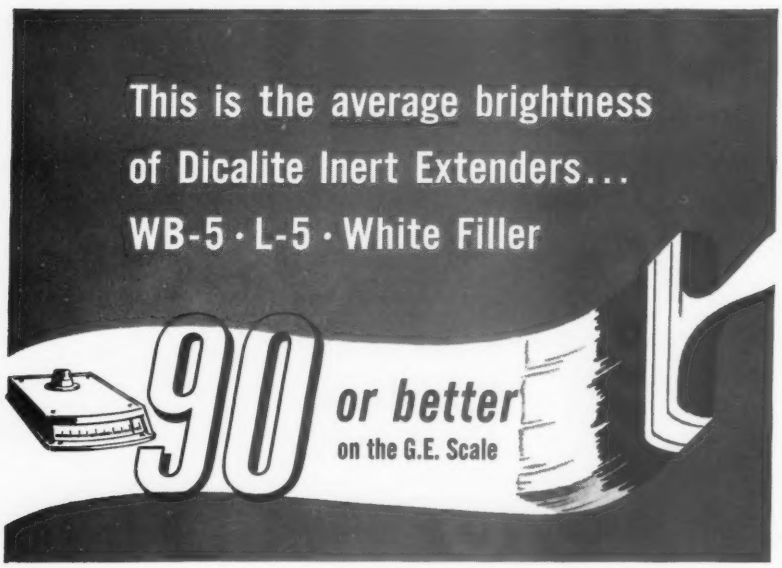
van AMERINGEN-HAEBLER: Arnold L. van Ameringen, formerly president of the company, has been elected to the newly created post of chairman of the board. **Charles P. Walker, Jr.,** formerly executive vice president, has been elected president.

ARNESTO PAINT: Lester Arnstein has been elected president, succeeding his father, the late Moritz Arnstein. **Barney Bakal,** vice president in charge of sales and advertising, has been elected executive vice president. Both men have been associated with the company for 28 years.

MERRITT-CHAPMAN & SCOTT: Herman B. Block has been appointed assistant to the executive vice president for procurement. He is now director of purchases for Devoe & Raynolds Co., a division of Merritt-Chapman & Scott's Chemical, Paint and Metallurgical Department. He will be succeeded in that post by **O. P. Moss,** now assistant director of purchasing.

CONTINENTAL CAN: Dr. Paul Erlandson, former chairman of the physics department and assistant vice president of Southwest Research Institute, has been named director of the department of physics at the company's new Central Research and Engineering Division.

BARRETT DIVISION: Three appointments to the technical service staff at the Glendale Plaskon Laboratory in Toledo, Ohio, have been announced. **Donald C. Davis** has joined the coating resins group to assist in developing products to meet specific requirements of the paint, varnish and lacquer trade. **John G. Mohr** and **Carl A. Marszewski** have joined the polyester resins staff to augment laboratory and field development work.



No other diatomite extender surpasses the brightness of these Dicalite Extenders. That is why Dicalite is so widely used by so many leading paint makers to extend the hiding power and coverage of more expensive prime pigments. And this increased coverage is only *one* of the *six* benefits Dicalite gives you. Write for complete information, including typical, time-tested paint formulations using Dicalite.

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Moore

Marshall
REICHHOLD CHEMICALS

Blyth

Duff
AMERICAN CYANAMID

Miss Connolly
ELEC. TESTING

Marshall
HOOKER

REICHHOLD CHEMICALS: **Waverly W. Moore** has been appointed a sales representative handling the complete line of resins, specializing in plywood adhesives. His territory will be the southern states.

William T. Marshall has joined the New Orleans, La., sales office. He was formerly with C. T. Patterson Co. of New Orleans.

AMERICAN CYANAMID: **Howard A. Blyth** has been appointed assistant to the general manager of the Organic Chemicals Division. . .**S. L. Duff** has been made sales representative for the pigments Division and will work out of the company's St. Louis office.

ELECTRICAL TESTING LABATORIES: **Miss Rita Connolly,** spectroscopist, has been appointed to the staff. She will operate the company's new Perk-in-Elmer double beam recording spectrophotometer and assist in analyzing test specimens submitted by clientele.

HOOKER GLASS & PAINT: **Walter P. Marshall** becomes manager of the branch at Davenport, Iowa. He was formerly associated with the Hamilton Glass Co., Inc., Chicago.

ARCHER-DANIELS-MIDLAND: **Walter G. Andrews** has been named assistant general sales manager. An assistant vice president, he was formerly manager of the Specialty Oils Department.

C. WITHINGTON: **Edward Wanderman,** formerly sales manager for France Campbell & Darling, Inc., has been appointed sales representative to the protective coatings and allied industries.

PENNSYLVANIA SALT: **Lee H. Clark,** general manager of the Sharples Chemicals Division, has been named vice president of the parent company. His major duties are expected to be concerned with corporate organization and planning functions.

REARDON: **Lee Webb,** Michigan sales representative, was elected a regional vice president of the National Paint Salesmen's Association. He represents the east central zone, consisting of Michigan, Ohio, and northern Indiana.

For Better Quality Paints Or Varnishes

It Will Pay You To Investigate Neville Resins

Neville manufactures a broad range of coumarone-indene and petroleum resins under such exacting quality control that absolute uniformity in your production is assured. In their various forms, they act as anti-skinning agents or water-proofing agents. They add resistance to acid and alkali and in the case of aluminum paints are in high favor since they promote leafing and leaf retention. If you are not already using these resins, it will pay you to use the coupon below to write for further information.

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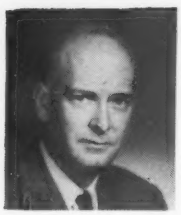

Bradley

METALS DISINTERGRATING

Merrill

Tudder

VELSICOL MAPICO

Cook

Ford

COLUMBIAN CARBON

METALS DISINTERGRATING: Loren C. Hurd has been appointed president and director. **D. C. Bradley** has been appointed general manager of the Pulverizing Machinery Division at Summit, N. J.

VELSICOL CHEMICAL: James D. Merrill has been appointed to the advertising staff.

MAPICO: Paul A. Tudder has joined the Technical Service Department.

COLUMBIAN CARBON: Gordon Cook has joined the company as general manager of colloidal dispersions. . .**William E. Ford** has joined the carbon black sales department and will be attached to the Akron, Ohio office.

INTERCHEMICAL: Virgil W. McDaniel has been named president of the Cotan Division, succeeding **C. T. Melvin** who is retiring from active management but who will continue in a consulting capacity.

NATIONAL BUREAU of STANDARDS: Louis R. Noffsinger has joined the Optics and Metrology Division. He will conduct research on searchlights, their components, and use in military operations. **Ray P. Teele,** a member of the Photometry and colorimetry Section, has been appointed a member of the National Research Council.

BENJAMIN MOORE: John E. Sweeney has been elected to the board of directors.

CELANESE: Dr. Bruce B. Allen has been named technical director of the Textile Division located in Charlotte, N.C. He succeeds **Dr. Robert T. Armstrong,** who was recently elected vice president-technical director of the corporation. . .**Samuel B. McFarlane** will serve as laboratory manager at Summit, N.J. . . .**Dr. Oren V. Luke, Jr.** is the new manager of the Plastics Research Department, Summit . . .**Dr. Russell O. Denyes** has been named manager of the newly created Fiber Research Department, Summit. . .**Dr. Michael J. Curry** has been appointed manager of the Chemical Division's Application Laboratory at Summit.

NOW You Can Stop Pressure Build-Up in Aluminum Paints With
SYLOID® AL-1
Tests conducted by the Aluminum Research Laboratories of Aluminum Company of America ". . . indicate that SYLOID AL-1, when used in concentrations up to 1% based on total weight of paint, effectively retards pressure development in ready-mixed varnish base aluminum paint containing moisture in concentrations up to 0.5%."
This problem of pressure build-up in ready-mixed aluminum paints has long been a serious one. Now this pressure development can be stopped. The leaf stability of the paint is not affected and the drying rate is not retarded.
For complete information on SYLOID AL-1, including results reported by Aluminum Research Laboratories, write
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Kaiser
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KINETIC

Lemersal
MIDLAND

R. J. BROWN: **L. J. Kaiser** has assumed the duties of assistant bulk sales manager, with headquarters at the home office in St. Louis, Mo.

PITTSBURGH PLATE GLASS: **Clarence M. Brown,** chairman of the board since 1931, has retired. He was elected honorary chairman and will continue to serve on the board. . .**Harry B. Higgins,** president of the company since 1944 succeeds Mr. Brown as chairman of the board . . .**David G. Hill,** vice president in charge of glass manufacturing, was elected president. . .**C. Robert Fay,** vice president and comptroller, was elected to board membership. . .**Albert Bauzenberger. Jr.** has been appointed assistant manager of industrial sales for the Philadelphia district. . .**Verne B. Spring,** formerly paint manager for the Denver distributing branch, has been appointed manager for the Cheyenne service branch. . . **Robert L. Holley** has been named manager for the Portsmouth retail branch. . .**Donald D. Parsons** has been named manager of the Galesburg, Ill., service branch. . .**Percy E. Knudsen** has been appointed assistant general manager of manufacturing with headquarters in Pittsburgh. . .**H. H. Douglas** has been named assistant general manager of the Newark, N. J. Paint Division. . .**Laurence N. Streff** has been named divisional engineer with headquarters in Pittsburgh.

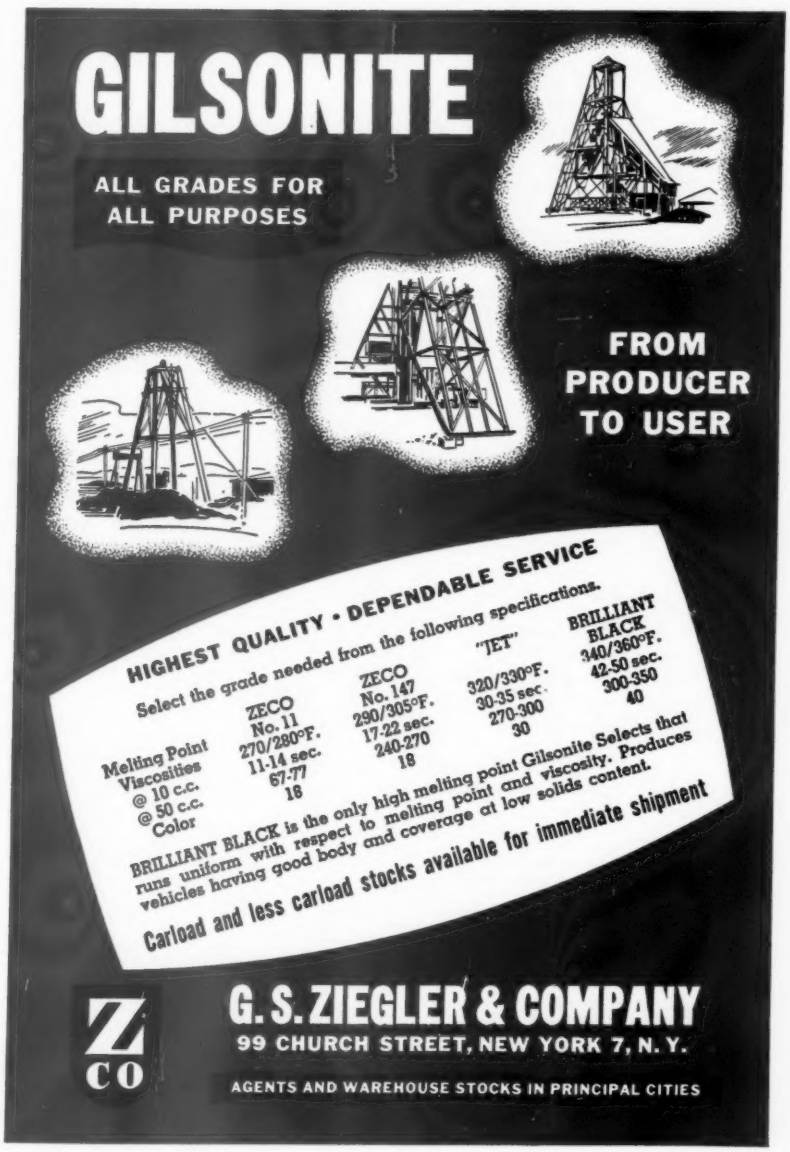
KINETIC DISPERSION: **John W. Gallagher** has been appointed regional sales manager in charge of sales on the Atlantic seaboard.

MIDLAND INDUSTRIAL FINISHES: **R. A. Lemersal** has been promoted to the position of Technical Sales Manager.

CARBIDE and CARBON: **George H. Fremon** has been appointed Patent Co-ordinator with headquarters in New York.

WITCO CHEMICAL: **Max A. Minnig** has been elected president, to succeed **Robert I. Wishnick,** who was advanced to chairman of the board and chief executive officer.
William Wisnick succeeds Mr. Minnig as executive vice president.

NEVILLE CHEMICAL: **Dr. George E. Foltz,** formerly with Columbia-Southern Chemical Corp., has accepted a position in the Research Department. . . **Allen W. Zahn,** recently associated with the Resin Division of U. S. Industrial Chemicals Co., has joined the staff of the Technical Service Department.



NEWS

Du Pont Titanium Dioxide Production To Increase

Titanium dioxide, a white pigment widely used in paint, plastics, paper and other products, will be substantially increased in production, according to an announcement from Du Pont.

F. H. Weismuller, general manager of the pigments department, said both the Edge Moor, Del., and the Baltimore plants will be expanded to produce additional quantities of the pigment, which is currently in short supply.

These two projects, coupled with a previously announced expansion at Edge Moor, will, when completed, increase the Du Pont Company's output of titanium dioxide by more than 25 percent. The first of the new facilities at Edge Moor should be completed by autumn. The second expansion at Edge Moor and the Baltimore project are scheduled for completion in 1957.

In addition to plans for additional capacity at existing plants, the company is conducting engineering studies on a new titanium dioxide plant near New Johnsonville, Tenn., looking forward to initial production in 1958.

Reichhold Chemicals, Inc. says this is the first tank truck delivery in chemical history of litharge. Delivery is being made to company's plant in Brooklyn, N. Y.

•

William A. Waldie Dies, Paint Expert Was 69

William Allshire Waldie, 69, retired technical director of New Wrinkle, Inc., Dayton, Ohio and nationally recognized authority on paint, varnish and lacquer, died in November.

Known as "Uncle Billy Wrinkle" to his many industrial associates, Mr. Waldie was an expert on industrial finishes, owning nearly 50 foreign and domestic patents dealing with coating compositions, pigmented gels, pigment dispersions and industrial derivatives of sugar.

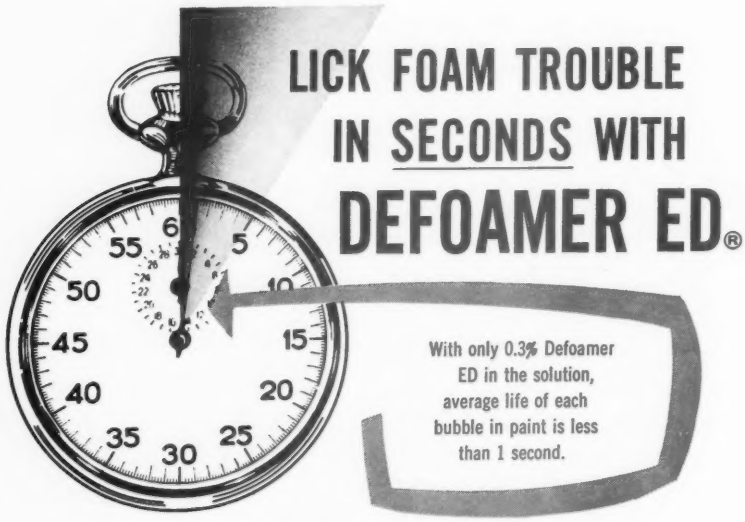
He was a fellow of the American Institute of Chemists and held memberships in the Engineers' Club of Dayton; Harvard Association of Chemists; National Society of Professional Engineers; and Dayton Chapter of the Ohio Society of Professional Engineers.

The author of "The Science of Wrinkle Finishes" and many technical articles, Mr. Waldie, a Harvard gradute, was a registered professional engineer in Ohio. He leaves his wife and a son, also an engineer and holder of many patents.

•

X-Ray Diffraction School

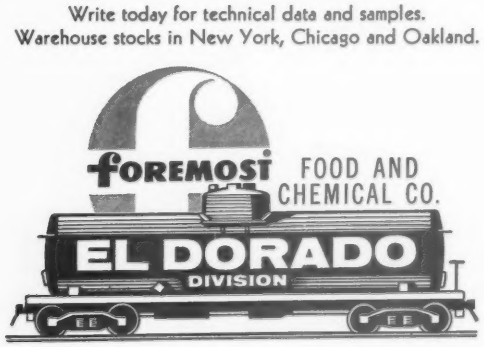
The twenty-third session of the Norelco X-ray Diffraction School for research and industrial registrants who can visit the New York City area will be held at the North American Philips Co., Inc., 750 S. Fulton Ave., Mount Vernon, N. Y. Jan. 30-Feb. 3. There is no fee.


LICK FOAM TROUBLE
IN SECONDS WITH
DEFOAMER ED®
With only 0.3% Defoamer ED in the solution, average life of each bubble in paint is less than 1 second.

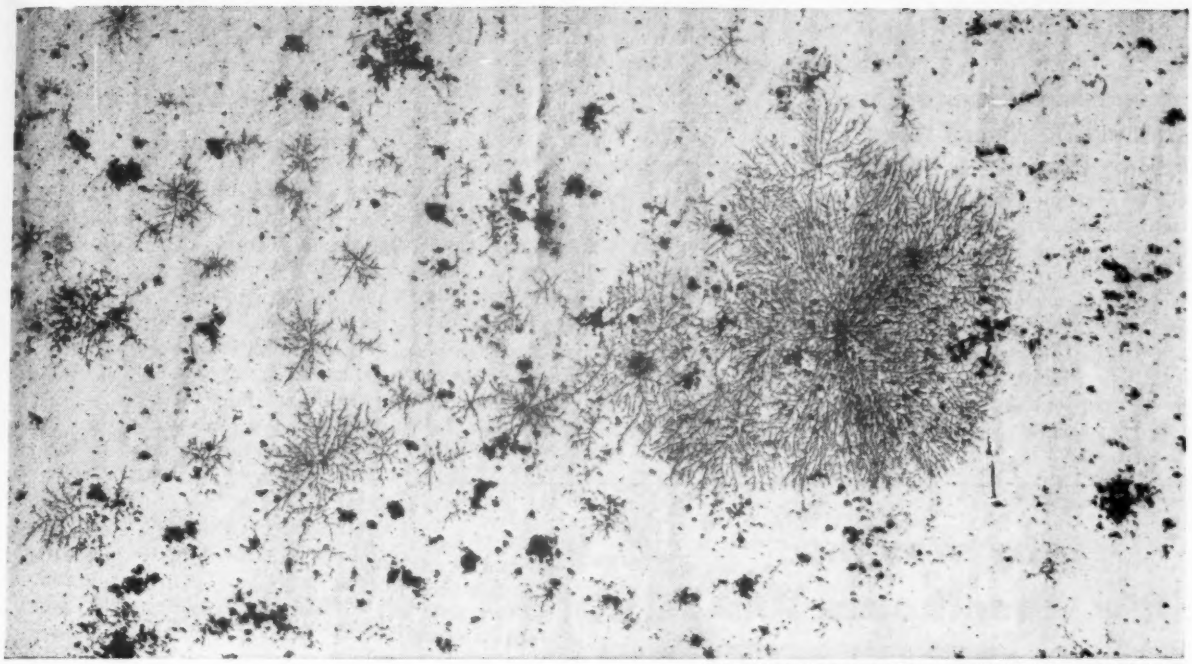
Defoamer ED and Eldefoam 400* lick foam problems in synthetic rubber latex based, polyvinyl acetate based, and acrylic based paints.

*New! Where "fish eyes" present a problem, especially in polyvinyl acetate based paints, try Eldefoam 400. (TM reg.)

Write today for technical data and samples.
Warehouse stocks in New York, Chicago and Oakland.



P. O. Box 599, Oakland 4, Calif.



TEN DIAMETER PHOTOGRAPH OF MILDEW AT NEW ORLEANS TEST SITE

HAVING MILDEW PROBLEMS?

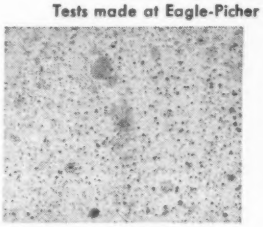
Then, formulate with

EAGLE-PICHER
Leaded Zinc Oxide

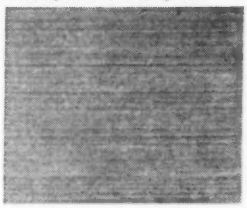
WITH EAGLE-PICHER LEADED ZINC OXIDE in your house paint formulation, you can provide improved resistance to mildew. Yes, scientific tests prove that house paints formulated with Eagle-Picher Leaded Zinc Oxide not only resist mildew discoloration but offer far superior decorative value and longer life at low cost.

HERE'S PROOF OF MILDEW RESISTANCE IN HOUSE PAINTS!

Tests made at Eagle-Picher Test Farm, New Orleans, La.



Mildew discoloration after 5 months vertical south exposure, without Eagle-Picher Leaded Zinc Oxide. (No fungicide used.)



No mildew after 5 months vertical south exposure, with paint* made from Eagle-Picher Leaded Zinc Oxide. (No fungicide used.)

***Formulation of Leaded Zinc Oxide Paint Used in Test**

Pigment—62.2%		Vehicle—37.8%	
E-P #356 Leaded ZnO	50.0%	Raw Linseed Oil	60.5%
TiO_2—Anatase	15.0	Z-3 Linseed Oil	19.5
Magnesium Silicate	35.0	Mineral Spirits	18.2
	100.0%	24% Pb	1.3
		6% Co	.5
			100.0%

PVC—32.0%

Since 1843

EAGLE EP PICHER

THE EAGLE-PICHER COMPANY

Largest Producer of Both Zinc and Lead Pigments

General Offices: Cincinnati 1, Ohio

Regional Sales Offices: Chicago, Cleveland, Dallas, New York, Philadelphia, Pittsburgh

NEWS

Engineering Award Goes To Dow Corning Corp.

Dow Corning Corp., Midland, Mich., a pioneer and leading producer of silicones, has received the 1955 Award for Chemical Engineering Achievement. The award was presented last month at a banquet in the Bellevue-Stratford Hotel in Philadelphia at which Dow Corning was honored for its pioneering work in the field of silicones.

Speaking before the 750 industrial and educational leaders attending the banquet, Gen. John E. Hull, president of the Manufacturing Chemists Association and former U. S. and UN Commander-in-Chief in the Far East, said that teamwork in scientific and industrial research, backed by enlightened corporate leadership is responsible for the success of Dow Corning and the silicone industry. He said that well organized, well planned, inspired research by teamwork is an American characteristic of research. He contrasted this with the European pattern where lingering caste concepts still tend to put the main glory and responsibility on one man.

Dow Corning was selected to receive the award by an 84-man committee composed of senior educators who head chemical engineering departments at colleges and universities accredited by the American Institute of Chemical Engineers and the Engineers Council for Professional Development. Chairman of the selection committee was Professor Walter G. Whitman of Massachusetts Institute of Technology who formally presented the award plaque to Dr. W. R. Collings, president of Dow Corning.

Since 1933 a dozen companies or industrial groups have received the award for their successes in the development, design and operation of great plants and processes. But, according to Prof. Whitman, in selecting Dow Corning as winner of the 1955 Award, the committee for the first time honored a company primarily for the successful participation of its chemical engineers in the commercial development of new products, markets and sales.

In accepting the award, Dr. Collings emphasized that the achievement was the result of group effort—by early silicone research scientists, by Dow Corning personnel and by another group, "the hundreds of engineers and other technical people who are employed by our customers and whose curiosity and desire to improve products of many kinds, were so essential to our success." "It seems to me that their counsel, their advice, their requests—even their demands were largely responsible for bringing this award to us tonight," Dr. Collings said.

•

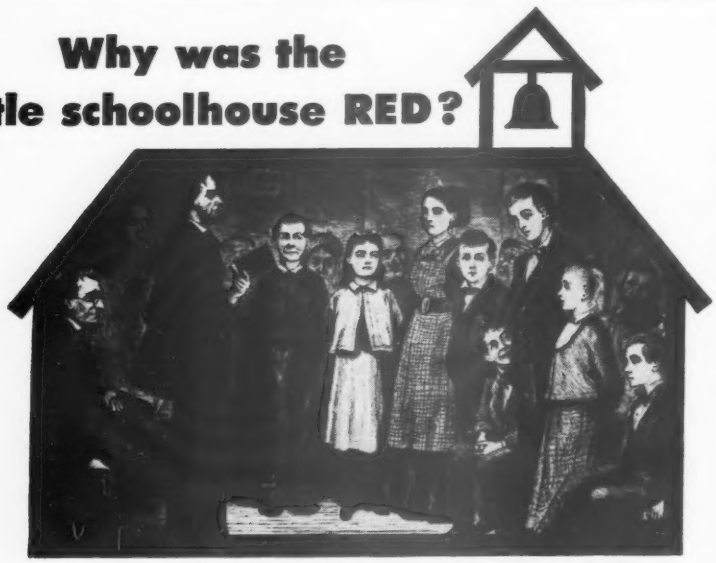
Purchases New Building

A five-story brick building containing about 75,000 square feet plus additional land in Long Island City, Queens, N. Y., has been purchased by Schwartz Chemical Co., Inc., manufacturer of dyes, decorative lacquers, and bonding agents for the plastics industry.

New Plant, Warehouse

A new Protection Products Mfg. Co. plant and warehouse at Eddington, Pa. has been announced by S. O. Hall, vice president and general manager. It will serve New England and the middle Atlantic states south through Virginia.

Why was the little schoolhouse RED?



AT THE turn of the century "the little red schoolhouse" was a familiar sight in the land. Because money came hard, these little frame structures were painted only infrequently. To protect their exteriors from the ravages of the elements, paints containing weather-resistant red iron oxide were used—the iron oxide lending its color as well as its durable protectiveness.

REICHARD-COULSTON produced much of the rich, red iron oxides which went into those long-lasting "little red schoolhouse" paints.

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NEWS

H. S. Ferguson Made Head Of Grace Chemical Group

Hugh S. Ferguson, president of Dewey and Almy Chemical Company Division of W. R. Grace & Co., has been named by the Grace board of directors as executive vice president in charge of the Chemical Group in the parent company.

H. S. Ferguson

At the same time the board announced the promotion of six other officers to wider responsibilities and the election of Alexander T. Daignault as an executive vice president and chief financial officer of the concern. Mr. Daignault comes to Grace from Westinghouse Air Brake Co. where he has been vice president in charge of finance.

Executive vice president Allen S. Rupley, whom Mr. Daignault succeeds as head of the financial services group, and Andrew B. Shea, who has been head of the South American group, both take broad corporate responsibilities.

Succeeding Mr. Shea as executive vice president in charge of South and Central American operations, as well as Grace Brothers Ltd. of London, and Pacific Coast and New York House Trading, is James H. Stebbins, most recently in charge of operations for Peru, Ecuador, Chile, and Bolivia. He will be assisted by John T. Whitely as deputy. Mr. Whitely is vice president in charge of industrial and marketing service for the South American group.

Lucas A. Alden, who has been vice president and controller for the company, moves up to replace Mr. Stebbins. Fred R. Feuss, until now assistant vice president and assistant treasurer, succeeds Mr. Alden as controller.

The new head of Grace chemical operations, with thirty-three years in the industry, has spent his entire business career with Dewey and Almy. He joined the firm upon graduation from Massachusetts Institute of Technology in 1923 and in various executive capacities has played a major role in the company's growth. He has been on the board of directors from 1926.

Mr. Ferguson became president of Dewey and Almy in January, 1953. When the company became a division of Grace in November, 1954, he was named a director and a vice president of the parent company.

The chemical group which he now heads includes four divisions—Dewey and Almy Chemical Co., Davison Chemical Co., Grace Chemical Co., and Grace Chemical Research and Development Co.

•

New Farnow Offices

Farnow, Inc., has moved sales and administration offices to new quarters in a building on the other side of its plant. The new address is 4-83 48 Ave., Long Island City 1, N. Y.

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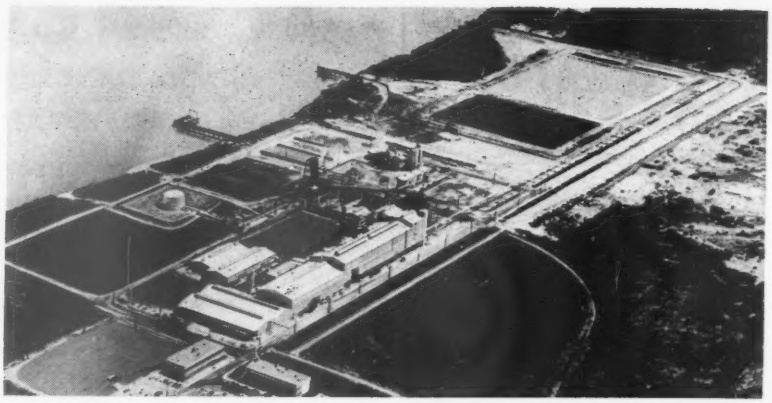
NEWS

Ted Adams, Vet, Eases Up

Theodore J. "Ted" Adams, executive vice president of Fred'k A. Stresen-Reuter, Inc., and a respected veteran of the industry, has gone into semi-retirement this month. He will, however, actively service many of the accounts he has built up.

Mr. Adams has been associated with the Stresen-Reuter organization since 1932.



American Cyanamid Plant

American Cyanamid Co. last month dedicated its new titanium dioxide plant at Savannah, Ga. The production facility which produces the white pigment represents an investment in the neighborhood of $15 million.

Cyanamid obtained an option on a 1600 acre tract in 1951 and construction was begun on the plant in the summer of 1953. The Savannah plant, which is operated by the Pigments Division, is the company's 49th production facility and its 20th in the South.

•

Vehicle Meeting

A talk by W. M. Gearhart, chief chemist of the sales development laboratory of the Eastman Kodak Co. on the latest developments in butyrate lacquers, will be given Jan. 11 at the Brass Rail Restaurant in New York City, it was announced by Oscar P. Muller, chairman and Benjamin Farber, vice chairman of the Vehicle Manufacturers' Committee of the New York Paint, Varnish and Lacquer Association.

•

Paint Technology Course

Rutgers University in cooperation with the New York Paint and Varnish Production Club and the New York Paint, Varnish and Lacquer Association has announced a course in "Fundamentals of Paint Technology" beginning Feb. 1.

Instructor is William Lawrence, B.S., Chemical Engineering. Mr. Lawrence is Technical Director of Trade Sales Finishes, Flood and Conklin Mfg. Co., Newark, N.J. Tuition for the course is $30. Checks should be made payable to Rutgers University, University Extension Div., Newark Center, 33 Washington St., Newark 2, N.J. Registration period is from Jan. 4 to Jan. 27.

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NEWS

Sidney Lauren To Teach At Brooklyn Polytechnic

Sidney Lauren, research chemist at the Johns-Manville Research Center Manville, N. J., has been appointed a visiting instructor in the Graduate School at the Polytechnic Institute of Brooklyn, N. Y., to teach the courses offered in organic coating technology.

Sidney Lauren

Mr. Lauren succeeds Professor Henry Fleming Payne, Adjunct Professor of Chemical Engineering, who, following his recent retirement from the American Cyanamid Co., is now a research professor at the University of Florida.

The courses which will now be under the direction of Mr. Lauren are: Oil, Resin and Varnish Technology and Paint and Pigment Technology.

Mr. Lauren who is in the finishes, adhesives and impregnance section of the Johns-Manville Research Center, is the former chief chemist of the C. J. Osborn Co., Linden, N. J. He has been an instructor in surface coating technology in the Division of General Education and Extension Services at New York University since 1950. He is a graduate of the City College of New York, a member of the American Chemical Society and the New York Paint and Varnish Production Club.

•

Study Isophthalic Use

Twenty-five chemists representing 18 western paint and chemical companies went back to school in Richmond, California recently. They completed a two-day course at the laboratories of Oronite Chemical Company's affiliate, the California Research Corp., in the use of Oronite isophthalic, a commercially new petrochemical for the production of superior paints and plastics.

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Graduate
PAINT RESEARCH

The following are condensed versions of several theses which were completed by candidates for the Master's Degree at North Dakota Agricultural College.

Heat Wetting Of Pigments By Wetting

Research to determine the heat of wetting of pigments by liquids has been conducted by Jelle P. Schoen of Amsterdam, Holland for his master's degree in chemical technology from the North Dakota Agricultural College in Fargo. Results are presented in his master's thesis.

A calorimeter with the required electrical apparatus was constructed to perform the experiments. The heat of wetting was measured on carbon black, chrome green and titanium dioxide in linseed oil and mineral spirits. More heat was freed from carbon black than from chrome green. The heat of wetting for titanium dioxide was zero or even negative in some cases. In most cases the heat of wetting was freed within two minutes after pigment immersion. In some cases the heat was freed at a slower rate.

The addition of wetting agents such as fatty acids and soya lecithin markedly influenced the heat quantities liberated in the cases of carbon black and chrome green. When carbon black was immersed into linseed oil an increase in the acid value of the oil did not materially change the heat of wetting and a decrease was noticeable when the acid number was raised to 20. Addition of one percent of soya lecithin resulted in an increased liberation of heat but additional amounts did not change the picture markedly.

When carbon black was immersed into mineral spirits the heat evolved was much smaller than with linseed oil. The addition of soya lecithin had a reverse effect here.

When chrome green was immersed into linseed oil the addition of fatty acids decreased the amount of heat liberated when the acid value was increased from 0.2 to 10, but had a reverse effect when the acid number was raised to 15. Soya lecithin in an amount of one percent did not influence the heat liberation but a large increase was noted when the percentage was raised to five percent.

When chrome green was immersed into mineral spirits the heat of wetting was very small and an addition of one per cent of soya lecithin did not result in a noticeable increase.

The influence of wetting agents was nil in the experiments with titanium dioxide.

Preparing Films of Good Continuity And Constant Thickness

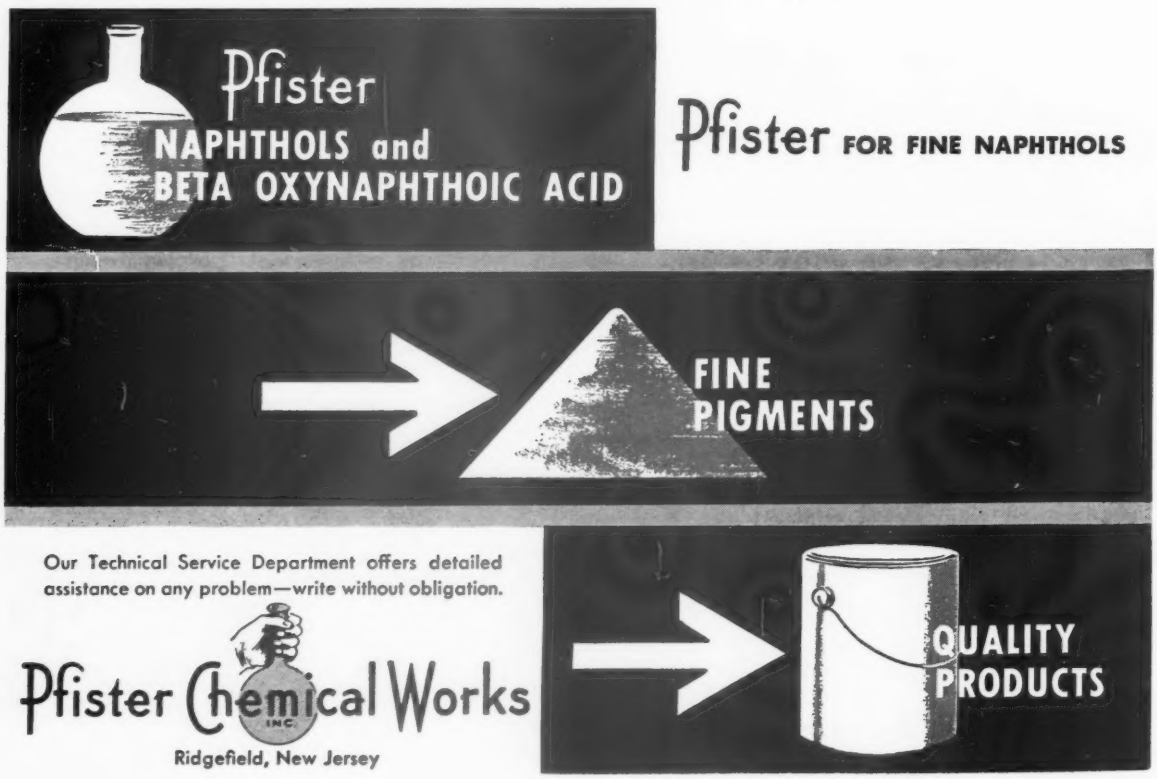
A new method of preparing free films of good continuity and constant thickness was developed and successfully used here by Patrick Martin of St. Paul, in research for his master's degree in chemical technology.

In the experiments outlined in his master's thesis, oil in water and water in oil emulsions were prepared from the same amounts of the same ingredients. The order of addition only was changed.

Films from an oil in water emulsion were lower in tensile strength than in the water in oil emulsion or varnish systems. Films from a water in oil emulsion were found to have similar tensile strength values as those from the corresponding varnish.

Martin also found that the tensile strength of films from both alkyd varnishes and alkyd emulsions increased from 10 to 30 days aging but appeared to remain constant or decrease slightly after 30 to 45 days.

No conclusions could be made concerning the effect of aging of an emulsion on its stress-strain properties. The elongation of dried films was less influenced by age than tensile strength.



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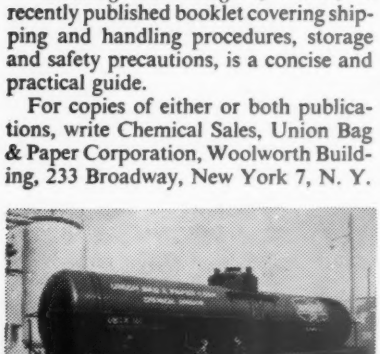
"*Handling and Storage of Unitol*," a recently published booklet covering shipping and handling procedures, storage and safety precautions, is a concise and practical guide.

For copies of either or both publications, write Chemical Sales, Union Bag & Paper Corporation, Woolworth Building, 233 Broadway, New York 7, N. Y.



Giant Tank Car Carries 19,000 Gallons of UNITOL

Now in regular line operation, this new 19,000 gallon tank car also will be used to transport crude tall oil from Union's present tall oil plant to the new Union distillation plant now under construction.

The new tank car is almost five times the size of some of those in use in the regular fleet. These have capacities of 4,000, 6,000 or 8,000 gallons.

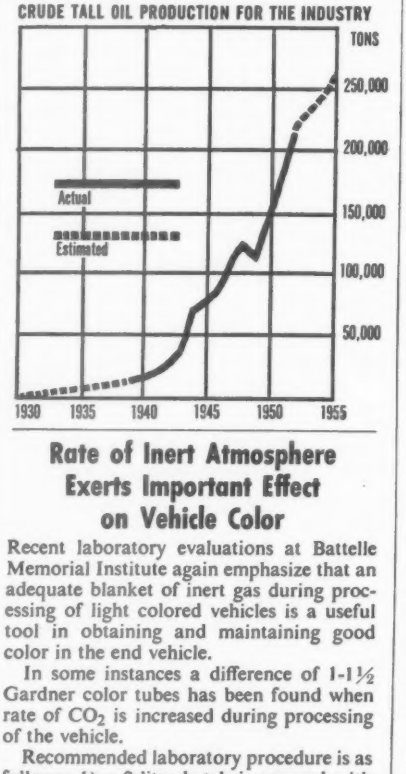
The tremendous capacity of the new car makes it more economical and advantageous to shuttle crude tall oil between Union plants in this way than to employ the usual pipe line and pump operation.

TALL OIL USES SPURT TO NEW HIGH

25 years of TALL OIL PRODUCTION

Production of crude tall oil, estimated at 265,000 tons for 1955, has risen from less than 25,000 tons annually in 1940. As shown in the chart, tall oil was first introduced commercially in the United States in the early 1930's.

CRUDE TALL OIL PRODUCTION FOR THE INDUSTRY



Rate of Inert Atmosphere Exerts Important Effect on Vehicle Color

Recent laboratory evaluations at Battelle Memorial Institute again emphasize that an adequate blanket of inert gas during processing of light colored vehicles is a useful tool in obtaining and maintaining good color in the end vehicle.

In some instances a difference of 1-1½ Gardner color tubes has been found when rate of CO_2 is increased during processing of the vehicle.

Recommended laboratory procedure is as follows: 1) a 2-liter batch is sparged with 2cc per second of CO_2, while a 5-liter batch is sparged at the rate of 3cc per second. Before cooling the vehicles, the CO_2 flow is doubled. This avoids the possibility of air entering the reaction flask under rapid cooling. Rapid cooling may cause a momentary vacuum in the flask.

Tall oil consumption in the paint and allied industries will reach a new peak by year end. Production of crude tall oil, which reflects industrial demand, has increased approximately 50 per cent in the first eight months of 1955, according to official data compiled by the Tall Oil Association.

Among the most significant recent developments in the industry has been Union Bag's introduction of *Unitol G-7*. This new Union product is a refined tall oil with outstanding color, color stability and improved drying characteristics. One of the lightest refined tall oils to be introduced commercially, it has opened significant new opportunities for tall oil utilization in white and light tints.

Unitol G-7 now is being used in the formulation of many end products or coatings where, previously, rigid color requirements had made tall oil impractical.

NEW TALL OIL DISTILLATION PLANT BEING BUILT

A new tall oil distillation plant with a processing capacity of 15,000 tons of crude oil annually is being constructed in Savannah by Union Bag.

The new distillation unit will separate crude tall oil into rosin and fatty acids. When completed, it will establish the Union Bag Savannah plant as the only operation in the country producing crude and refined tall oil, distilled tall oil, and tall oil rosin and fatty acids.

The design for the new distillation installation was selected after extensive investigations of several Swedish, German and American processes developed for the fractionization of tall oil.

When completed, the plant, with many new and exclusive features, will be the most modern tall oil distillation unit in the United States.

Usefulness of Linseed Oil By Hydroxylation Found Unsatisfactory

Attempts to improve the usefulness of linseed oil by hydroxylation for use by the protective coating industry were found not satisfactory in research here by Eugene Rueve, Fargo. Research was done for the master's degree in chemical technology and described in his master's thesis.

When linseed oil was oxidized with large quantities of formic acid and hydrogen peroxide and 1 N sodium hydroxide used to hydrolyze groups of the derivative no oil was recovered.

Rueve concludes that much more complicated products were formed than was anticipated and further research must be done.

Preparation of Free Fillers From "Methocel" Substrate

An improved method of preparing free paint films from a "methocel" substrate has been developed here by Frank J. Macekonis of Chicago, in research for his master's degree in chemical technology.

Macekonis studies the effect of pigmentation on the stress-strain properties of paint films and found the addition of a pigment increases the tensile strength of a film but decreases its elongation. Results show that the degree of influence depends upon the chemical nature of the pigment as reactive zinc oxide pigments showed a more marked increase in the tensile strength of the films than the inert talc pigments.

He also found that pigment particle shape had some influence on stress-strain properties but no definite conclusions can be made from tensile strength and elongation measurements alone.

Modified Linseed Oil Paints

A new type of modified linseed oil paint has been developed here by Manuel Vera Caneri of Lima, Peru, who recently received his master's degree in chemical technology.

The method is expected to stimulate the use of linseed oil in its competition with purely chemical ingredients in the manufacture of emulsion paints.

Vera Carneri found that emulsion paints prepared from linseed oil vinyltoluene copolymers have properties similar to synthetic latex paints. The study is outlined in his master's thesis.

Hardening of the linseed oil paint was somewhat slow, as was expected, but after one week of air drying all paints behaved similarly in washability. The linseed oil paint has a greater adhesion to glass and better weather resistancy after three months of outside exposure.

Two New Plants Added By U.S. Industrial Chemicals

Two new combination alcohol denaturing plants, bonded warehouses, and solvent distribution points have been added by U. S. Industrial Chemicals Co., Division of National Distillers Products Corp., New York City.

One is at Tuscola in central Illinois, the production point of U.S.I.'s synthetic alcohol, while the other, at Newark, N. J., replaces a smaller denaturing operation a few blocks away. These new plants, along with existing units at New Orleans; Anaheim, Calif.; and Chicago, permit overnight, and often same-day emergency deliveries to alcohol and solvent users throughout most of the country. Integrated facilities at all locations can supply pure alcohol, denatured alcohol, "Solox" proprietary alcohol solvent, as well as other chemical solvents, in straight deliveries and mixed shipments in compartment tank cars, tank trucks, box cars and trucks, according to the company.

The Newark plant has a 10 million gallon per year rated capacity, while the Tuscola unit has a flexible 12 million gallon per year capacity.

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abstracts

Zinc Chromates for Anti-Corrosion Primers and Wash-Primers

Fette und Seifen, vol. 55, No. 12, p. 898.

While as a zinc yellow coloring pigment there is used a strong-colored, lead-free zinc-potassium chromate double salt, when zinc chromates are being employed as corrosion inhibitor pigments, the color tone plays only a small role. For priming iron and steel surfaces in general, a zinc yellow with a high chromate content serves. It should contain small amounts of lead chromate and not quite attain to the lead-free zinc yellow as regards clearness and purity.

Zinc chromate for reaction primer must, on the other hand, be lead-free as even a small lead content acts in an adverse manner on aluminum and magnesium metal surfaces. For wash primers on light metal surfaces, the zinc yellow must be electrolyte-free. Zince tetroxychromate is very suitable for this purpose; this is almost insoluble and gives up just as many chromium ions as is necessary for a passivation of the metal surface. The relatively low content of 17% CrO_3, and the high content of about 67% ZnO ensures its compatibility in the polyvinylbutyral solution and a satisfactory corrosion protection after the addition of the phosphoric acid in isopropyl alcohol solution.

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Primer Finishes For Light Metal Alloys

By J. G. Rigg and E. W. Skerrey: Paint Manufacture (G. Britain). pp. 75-84.

Weathering tests which were conducted over a period of 3½ years in agricultural, industrial and marine surroundings confirmed in their results, the test data obtained from a previous 6 month weathering test campaign. It was found that zinc chromate and tetraoxychromate protect better than iron oxide paints although the latter also gave a sufficient corrosion protection in less strongly aggressive environments, particularly on aluminum.

Coatings of red lead clearly showed themselves to be of a harmful nature on light alloys, particularly on magnesium in a strongly corroding medium. In such surroundings the two chromate primers showed themselves to be easily superior to the red lead on steel. Zinc chromate and zinc tetraoxychromate pigments are to be preferred as primer coatings for mixed constructions of steel and light alloys under strongly corrosive conditions, while under milder conditions, iron oxide will suffice.

Paints For Corrosion Protection Of Metals

By H. W. Rudd: Paint Manufacture (G. Britain), vol. 23, No. 2, pp. 41-44.

The durability and service life of a rust-protective finish coating is to a great extent dependent on the pre-treatment of the metal surface. In this connection in the case of steel, an important factor is the removal of the rolling skin which initially adheres very firmly to the steel, but under the influence of corroding agents, assumes cracks and then acts as a cathode against the metal. With modern, rapid methods of building construction, it is not possible to rely on weathering effects for the removal

of the scale. Acid pickling is limited to the smaller and not greatly profiled work parts. The mechanical cleaning processes are universally applicable. An intact rolling skin can be removed by flame-scaling.

The cleaned steel surface is very sensitive to rusting and must be treated immediately with a first coating. Phosphating and protective coating is obtained by means of the reaction primers in one stage. The primer is sprayed on in a thickness of 0.1 to 0.4 thous. An effective cathodic protection of the iron is achieved with highly pigmented, zinc dust paints. According to English experience with these paints, the dry film should contain at least 95% zinc. Zinc dust paints with inorganic bonding agents are used for under-water painting. Satisfactory results have been obtained by a paint with magnesium oxychloride. A paint on the basis of zinc phosphate should be still better and this also keeps longer after being made-up. Also a zinc dust primer with polystyrol binder is indicated, and this is particularly intended for ships bottom coating.

The zinc dust-polystyrol film shows maximum hardness and adhesion. The anti-corrosive action of the zinc dust paints is strengthened in sea water. Weak rust on the base metal scarcely affects the protective action as zinc in contact with an electrolyte (sodium chloride) reduces the oxide to metallic iron and thereby produces a metallic contact. The zinc is converted into zinc hydroxide in this way, which effectively protects the iron in combination with calcium and magnesium hydroxides and carbonates from the sea water. Iron and steel coated with zinc dust paints in the course of time, show at most a weak, uniform rusting but never point corrosion or pitting corrosion respectively.

The zinc dust film protects also bounding metal places which have been bared, either by incomplete coating or by film damage. Lead paints also develop the same effect as zinc paints in under-water coatings, because they form lead hydroxide and lead linoleate which are absorbed at discontinuities of the oxide film and suppress an anodic attack. Aluminium paints cannot be effective in the same way, as the aluminium metal particles as a consequence of the oxide film, have a high electrical resistance. Nevertheless, a strongly pigmented aluminium paint as a consequence of its physical impermeability, can offer an effective under-water protection. A combination of zinc-dust primer finish and a dual coating of aluminium cover coat paint with a non-saponifiable bonding agent gives an exceptional corrosion protection.

The man who could do anything-once!

It seems this paint chemist was versatile (too versatile, if you believed the production superintendent).

The trouble was he could never make the same alkyd twice from any two lots of fatty acid or vegetable oils. Too much variation in composition, he claimed.

One day the purchasing agent suggested ACINTOL® FA Fatty Acids. "I hear it's a highly uniform fractionated product," he said. "Why don't you try it?"

"I'll try anything once," said the chemist. And he did. It was the only formulation adjustment he had to make.

Now, ACINTOL FA Fatty Acids are their standard in alkyd formulations—and our chemist friend is looking closely into ACINTOL D Distilled Tall Oil and ACINTOL Tall Oil Rosin.

Have you looked at what the uniformity of ACINTOL FA and other ACINTOL products can mean in your formulations? We'll be glad to help you evaluate them. For further information, write for the ACINTOL Bulletin.

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- Controls flow and leveling
- Improves brushability

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Glycerine Producers To Meet In N. Y. C. Jan. 25-27

The annual meeting of the Association of American Soap & Glycerine Producers, Inc. will be held January 25-27 at the Waldorf-Astoria Hotel in New York City.

Two Divisions—the Fatty Acid and the Glycerine—have programs of interest to the paint industry. On Wednesday morning, January 25th, the Fatty Acid Division's General Business Meeting will include the following: "Steering Committee Report," F. C. Haas; "Research and Technical," W. B. Brown introducing D. Swern and B. Ackerman; "Market Development," J. M. Hoerner; "Education and Publicity," R. P. Trauth; and "Statistics," L. F. Church.

On Wednesday afternoon, E. L. Burtis, FAO of the United Nations will discuss "World-Wide Fats and Oils Situation" at a joint Fatty Acid-Industrial Division meeting.

The same afternoon, Richard B. Mortimer, Treasurer and General Manager, Peterson Manufacturing Co., Los Angeles, will discuss "Why Renderers are Sponsoring Research." Mr. Mortimer is also President of the National Renderers Association.

The Glycerine Division meets Thursday, January 26th. The afternoon session will hear Oscar P. Muller of National Lead Co. speak on "New Developments in Alkyd Resins"; Max Wolf, Quartermaster Food & Container Institute on "New Developments In Acetylated Glycerides"; and Leo Pasternak on "Foreign Trade and Trends In Glycerine."

•

Ziegler Enlarges Plant

G. S. Ziegler, general manager of G. S. Ziegler & Co., New York, has announced that the addition to the manufacturing and warehouse building of the new Cornelius Wax Refining Division at New Market, N. J., will be finished early this year.

CHEMISTS AND CHEMICAL ENGINEERS

For Product development of chemicals for protective and decorative coatings. Outstanding growth potential in recently formed Product Development Department of the ATLAS POWDER COMPANY, located in Wilmington, Delaware. 2-5 years experience in emulsion paints desirable. Direct all replies to:

R. L. Herrman, Atlas Powder Company, Wilmington, Delaware, marked personal. All responses held confidential.

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COLOR: Extremely white.
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TECHNICAL Bulletins

"METHYLON" RESINS

A folder with technical data sheets on "Methylon," the company's new family of corrosion resistant resins, has been issued by the Chemical and Metallurgical Dept., General Electric, Schenectady, N.Y.

• The folder contains product data and suggested formulations for product in coatings for drum linings, tank cars, chemical tanks, process equipment, food containers, motors, appliances, air-conditioning equipment, water tanks, etc.

DIISOCYANATES

National Aniline Division, Allied Chemical & Dye Corp., 40 Rector St., New York 6, N.Y., has issued a series of six technical bulletins on "Nacconates" (Diisocyanates), believed to contain the most comprehensive data so far made available on the properties and reactivity of this group of polyurethan chemicals.

National Technical Bulletin I-17 is a fundamental brochure on diisocyanates as a class. Its 24 pages include generic properties, data on 27 basic reactions common to all diisocyanates, eight pages of suggested uses and a list of 132 literature references.

Five supplementary technical bulletins, I-17A-I-17E, give specific technical data on the "Nacconates" (Diisocyanates) now being produced by National Aniline Division.

SILICONE REFERENCE GUIDE

The 1956 Reference Guide to Dow Corning silicone products describes almost 150 of the most generally used silicone products, 18 of which were first introduced within the last 12 months.

The products are grouped by physical form and cross-indexed by usage enabling them to be located by what they do, as well as by what they are. Product descriptions are condensed, fact-packed, and devoted to essential data. Thoroughly illustrated with charts, tables, graphs and application photographs.

FLATTENING AGENT

Davison Chemical Co., has issued a technical bulletin on the use of its "Syloid 244" product for flatting vinyl lacquers, to give a low-gloss effect. Extensive tests are reported in detail. Write to the company's Sales Control Dept., Baltimore 3, Md.

SYNTHETIC CHEMICALS

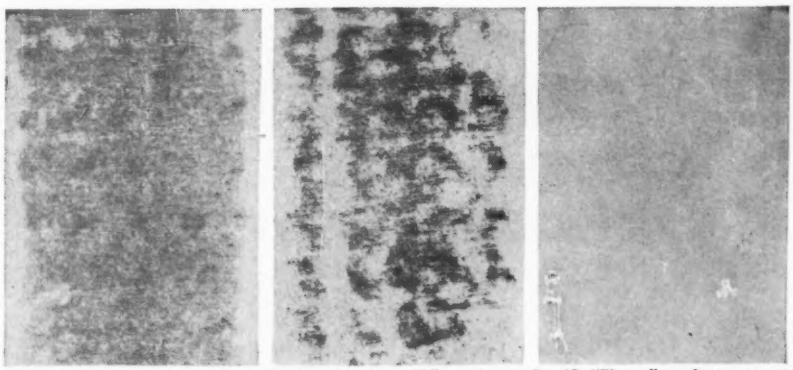
The 1956 edition of the 24-page booklet, "Physical Properties of Synthetic Organic Chemicals," has been issued by Carbide and Carbon Chemicals Co., 30 E. 42 St., New York 17, N. Y. This booklet is prepared annually as a helpful guide for chemists, engineers, purchasing agents, and laboratory workers.

The edition, F-6136, features 32 new products available from the company and presents the latest data on more than 350 organic chemicals. The products are arranged by related groups with condensed data on applications. Physical properties are given in tabular form. An alphabetical index is included for easy reference.

METALLIC STEARATES

"Stearates, Their Properties and Uses," a comprehensive 36-page bulletin outlining the properties and uses of metallic stearates, has been published by Witco Chemical Co., 122 E. 42 St., New York 17, N. Y.

The bulletin, No. 55-2, lists the composition of 46 metallic stearates, shows graphically the industries



Panel 1—Copolymer "A" on asbestos cement panel after 50 wet rubs.

Panel 2—Copolymer "B" on asbestos cement panel after 50 wet rubs.

Panel 3—"Elvacet" on asbestos cement panel after 1,000 wet rubs.

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POLYVINYL ACETATE EMULSIONS

The unretouched photographs above tell the story. After only 50 wet rubs with a Gardner Washability Machine—Panels 1 and 2 showed complete paint failure. Film integrity was low, indicating poor coalescence. These panels were painted under controlled conditions at 40°F. with formulations based on copolymer polyvinyl acetate emulsions. In each case, the manufacturer's suggested formulation *included the use of a coalescing agent.*

Panel 3 was painted with a Du Pont suggested formulation based on "Elvacet"* at the same temperature and under the same controlled conditions as Panel 1 and 2. This third panel showed no sign of failure, even after 1,000 wet rubs.

Results such as these plus easy application, resistance to fading and yellowing, alkali resistance, fast-drying properties, and extensive exposure data help make "Elvacet" the most popular polyvinyl acetate emulsion for preparation of fast-selling exterior masonry paints.

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in which they are used and presents an analysis of recommended applications. Other helpful data include an explanation of Witco's analytical procedures, government specifications for metallic stearates, shipping information and a guide to other Witco products.

ALKYD VEHICLE PRIMER

Red Lead Technical Letter No. 10, titled "L.I.A. Formula 3-7, A Red Lead Alkyd Vehicle Primer for Industrial and Marine Environments" has been issued by the Lead Industries Association, 420 Lexington Ave., New York 17, N. Y.

The formula is suggested to industrial users as a primer for paint systems to protect steel surfaces exposed in chemically contaminated atmospheres and marine environments such as storage tanks, ship superstructures, bridges and dock installations.

PE TYPES

Heyden Chemical Corp., 342 Madison Ave., New York 17, N.Y., has published two new technical bulletins, "Monopentek," and "Tripentek."

The "Monopentek" bulletin gives product data, including specifications and summarizes the more important reactions of pentaerythritol.

The section on "Uses" describes the applications of "Monopentek" in alkyds and other resins for surface coatings, comparing the properties of such alkyds with those made from "Pentek," Heyden's technical pentaerythritol.

Bulletin on "Tripentek" reports on processing hints and resin formulations developed in Heyden's laboratories for this high-melting, water-insoluble polyol.

COLOR DESIGNATION

"The ISCC-NBS Method of Designating Colors and a Dictionary of Color Names," by Kenneth L. Kelly and Deane B. Judd, National Bureau of Standards Circula 553, is available from the Government Printing Office, Washington 25, D.C. The 158-page publication sells for $2.00

The circular is designed to assist the scientist, businessman, and layman to understand the different color vocabularies used in the many fields of industry, art and

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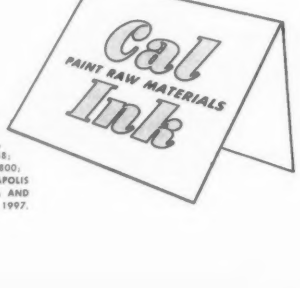
6. TECHNICAL ASSISTANCE—Cal Ink research laboratories with over fifty chemists offer paint formulation and color research assistance. Nine years experience packaging tube colorants. Write for your complete evaluation kit and details of Cal Ink Universal Color Systems today.



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science. The dictionary serves not only as a record of the meanings of the 7,500 individual color names listed but also enables anyone to translate from one color vocabulary to another.

The terms by which this dictionary defines color names are those of a refinement of the method of designating colors outlined by the Inter-Society Color Council (ISCC) and developed at the National Bureau of Standards.

FIRE, ACCIDENT CONTROL

A fire and accident control "information service," said to be the first of its kind in the field of information services, has recently been announced by Loss Control Associates, 629 Oakmont Dr., Plattsmouth, Neb.

After eight years of assembling, research and compiling, an "Index and Directory" of Fire and Accident Control Codes, Standards, and References is being offered. It was developed for the express purpose of providing a fast and reliable means of locating any information desired on accident prevention, fire control and health and sanitation contained in nationally recognized Codes and Standards and reliable References.

ENGINEERS' JOB DIRECTORY

"Engineers' Job Directory" lists the requirements of 236 major companies in capsule form. This compact information gives the engineer pertinent facts as related to his specialty. Chemical, process, and petroleum engineering are itemized with the names of firms needing engineers trained in these fields. Some 63 other engineering divisions are listed.

A typical company listing gives the firm name, address, and date of founding. The products it produces are outlined as well as the industry to which it belongs. Indicating the size of the company is the total number of employees. Then the name and title of the company official to whom job inquiries should be directed rounds out the information.

Copies may be obtained direct from the publisher, Decision Inc., 1483 First National Bank Bldg., Cincinnati 2, Ohio. Price is $3.25 including postage.

AUTOMOTIVE REFINISHING

Latest techniques and equipment for automotive refinishing are described in a new manual published by the Martin-Senour Paint Co., 220 S. Quarry St., Chicago, Ill.

The 40-page book, called "A Guide to Better Automotive Refinishing," covers all aspects of professional refinishing including the selection of proper equipment, application techniques, methods for stripping and preparing surfaces, and product information. A large section of the guide discusses and illustrates some 30 problems in refinishing such as blistering, water spotting, wrinkling, peeling, lifting, and matching.

SOLVENT RECOVERY

A 36-page booklet, Form 4410D, on the Columbia activated carbon system of solvent recovery has been issued by Carbide and Carbon Chemicals Co., 30 E. 42 St., New York 17, N. Y. The booklet gives technical data on activated carbon and describes the efficiency and economy of recovering solvent vapors in a variety of industries.

STORAGE EQUIPMENT

Precision Equipment Co., 3700 N. Milwaukee Ave., Chicago 41, Ill., has published a catalog featuring steel shelving, lockers as well as other storage and maintenance equipment for industrial and institution use.

The popular choice is Schenectady SA-408 Alkyd Resins

Our sales records tell the story of the growing acceptance of these resins. More and more customers are specifying them for white finishes on such products as kitchen appliances and hospital equipment and as high quality lacquer plasticizers. There are sound reasons for this success. SA-408 Alkyds insure light color, good color retention, uniform composition from batch to batch and a complete range of hardness, viscosity and solvent as shown below:

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Viscosity	Z_2-Z_3	X-Z	Z_1-Z_2	Z_1-Z_4
Color	2-3	2-3	1-3	1-3
Acid Number	4-6	3-5	4-6	4-6
Specific Gravity	1.035-1.045	1.030-1.045	1.040-1.060	1.040-1.060

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1956 Du Pont Grants

A fund of over $900,000 for grants to over 100 universities and colleges for the 1956 academic year has been announced by the Du Pont Co. This represents an increase over the $800,000 in gifts made last year.

All of the increase and nearly half of the entire new program are for the improvement of teaching in colleges, universities and high schools. The grants will support science and mathematics as well as other subjects.

"Plextone" Sales Staff

Smith-Davis Co., Los Angeles, a division of Maas & Waldstein Co., Newark, N.J., has established a separate sales organization for the multicolor enamel known by the Maas & Waldstein trademark as "Plextone."

CALENDAR OF EVENTS

Jan. 23-26. 7th Plant Maintenance & Engineering Show & Conference, Convention Hall, Philadelphia, Pa.

Jan. 25-27. Assn. of Amer. Soap & Glycerine Producers, 29th Annual Meeting, Waldorf-Astoria Hotel, New York City.

Feb. 23-24. 10th Divisional Protective Coating Conference, Chemical Institute of Canada. Feb. 23—Royal York Hotel, Toronto; Feb. 24—Sheraton-Mount Royal Hotel, Montreal.

Feb. 27-Mar. 2. ASTM Committee Week, Statler Hotel, Buffalo, N. Y.

Feb. 29-Mar. 2. 20th Annual Convention Southern Paint and Varnish Production Club, Atlanta Biltmore Hotel, Atlanta, Ga.

Production Club Meetings

Baltimore, 2nd Friday, Park Plaza Hotel.

Chicago, 1st Monday, Furniture Mart.

C.D.I.C., 2nd Monday.
Cincinnati — Oct., Dec., Mar., May, Hotel Alms.
Dayton — Nov., Feb., April, Suttmillers.
Indianapolis — Sept., Claypoll Hotel.
Columbus — Jan., June, Fort Hayes Hotel.

Cleveland, 3rd Friday, Harvey Restaurant.

Dallas, 2nd Thursday, No Fixed Place.

Detroit, 4th Tuesday, Rackham Building.

Golden Gate, 3rd Monday, El Jardin Restaurant, San Francisco.

Houston, 2nd Tuesday, College Inn.

Kansas City, 2nd Thursday, Pickwick Hotel.

Los Angeles, 2nd Wednesday, Scully's Cafe.

Louisville, 3rd Wednesday, Seelbach Hotel.

Montreal, 1st Wednesday, Queen's Hotel.

New England, 3rd Thursday, University Club, Boston.

New York, 1st Thursday, Brass Rail, 100 Park Ave.

Northwestern, 1st Friday, St. Paul Town and Country Club.

Pacific Northwest, Annual Meetings Only.

Philadelphia, 3rd Wednesday, Engineer's Club.

Pittsburgh, 1st Monday, Fort Pitt Hotel.

Rocky Mountain, 2nd Wednesday.

St. Louis, 3rd Tuesday, Forest Park Hotel.

Southern, Annual Meetings Only.

Toronto, 3rd Monday, Diana Sweets, Ltd.

Western New York, 1st Monday 40-8 Club Buffalo.

Canco Pacific Addition

American Can Company's $2-million Pacific plant addition at San Francisco, which it claims makes it the largest can-making factory in the West, was formally opened Nov. 28.

R. C. Stolk, vice president in charge of Canco's West Coast operations, said the new construction added 346,000 square feet to the existing factory. The total floor area of the plant is now more than 800,000 square feet. The expanded plant is capable of producing one billion 500 million metal and fibre containers annually.

•

Two Veterans Retire

Two veterans of the paint industry, each serving the company over forty-five years, retired last month from Benjamin Moore & Co., New York.

George W. Jenkin began with the company in 1908. At his retirement, he was serving as chairman of the board of directors of Benjamin Moore & Co. and of Benjamin Moore & Co., Ltd.; Leo Silverstein started with the company in 1906.

CLASSIFIED ADVERTISEMENTS

Rates: $.20 per word, except those seeking employment, for which rate is $.10 per word. Minimum: ten words. Address all replies to Box Number, c/o Paint and Varnish Production, 855 Avenue of the Americas, New York 1, New York.

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Troykyd Colloidisperses are recommended for improved dispersion, wetting and anti-settling. It was established after extensive experimentation that no one product would work equally well in all formulations. By developing two Colloidisperses we can now offer a product that is best suited to your requirements. An appraisal of their properties, as listed below, will give some indication of the vast variety of applications of either of these products to difficult production problems. We welcome your requests for samples and further information.

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- IMPROVES GRIND
- REDUCES SETTLING
- REDUCES PUFF
- HIGHER PIGMENT LOADINGS
- BETTER DRAINAGE OF PEBBLE AND BALL MILLS
- BETTER WETTING ACTION ON PIGMENTS
- EXCELLENT FOR TINTING PASTES
- IMPROVES GLOSS

No. 2

- IMPROVES GRIND
- IMPROVES FLEXIBILITY
- DEVELOPS HIDING POWER
- COMPATIBLE WITH BOTH PAINTS AND LACQUERS
- IMPROVES GLOSS AND GLOSS RETENTION
- IDEAL FOR TINTING PASTES
- BETTER WETTING ACTION ON PIGMENTS
- MAKES UNIVERSAL TINTING PASTE

TROY CHEMICAL COMPANY

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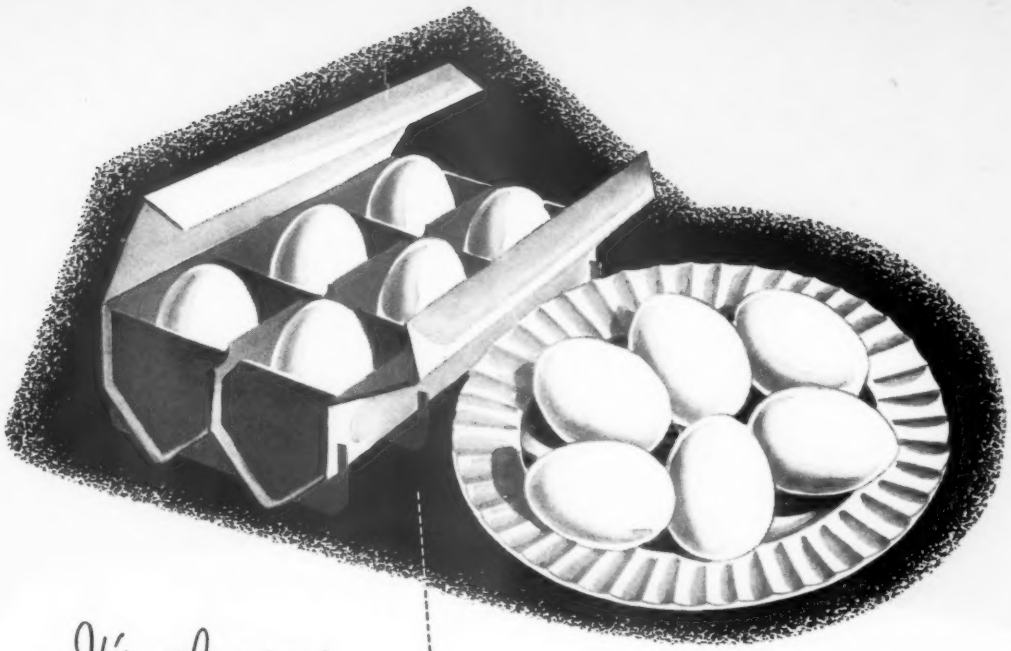

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How HYDRITE Kaolinites affect the HIDING POWER of Polyvinyl Acetate Emulsion Paints

HYDRITE Kaolinites impart an exceptional degree of dry hide to polyvinyl acetate emulsion paint systems. The amount of dry hide contributed depends largely on the particle size distribution of the individual Kaolinite. It is not significantly affected by the individual PVAc emulsion as is gloss (see advertisement #5 in this series).

Curves at the right were obtained using different grades of HYDRITE Kaolinite in typical PVAc formulations. Pigmentation was varied as shown in table below to effect differences in PVC.

Major Non-Volatile Ingredients	25% PVC	35% PVC	45% PVC	Spreading rate approximately 400 sq. ft/gal
	lbs./gallon			
TiO2 (rutile, non-chalking)	2.5	2.0	1.5	
Kaolinite	0.3	1.2	1.8	50% non-volatile
PVAc Solids	2.5	2.0	1.5	

Data presented in the graph and the table show that a judicious choice of kaolinite particle size gives the formulator several avenues for increasing dry hide without adding prime pigment or for holding dry hide constant and reducing the amount of prime pigment.

Technical Service Bulletin TSBH-12, giving further details, is being prepared.

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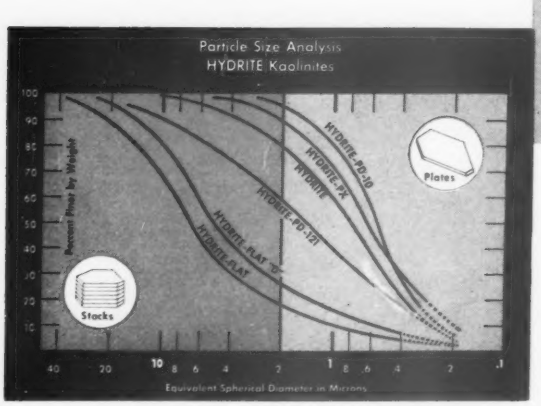
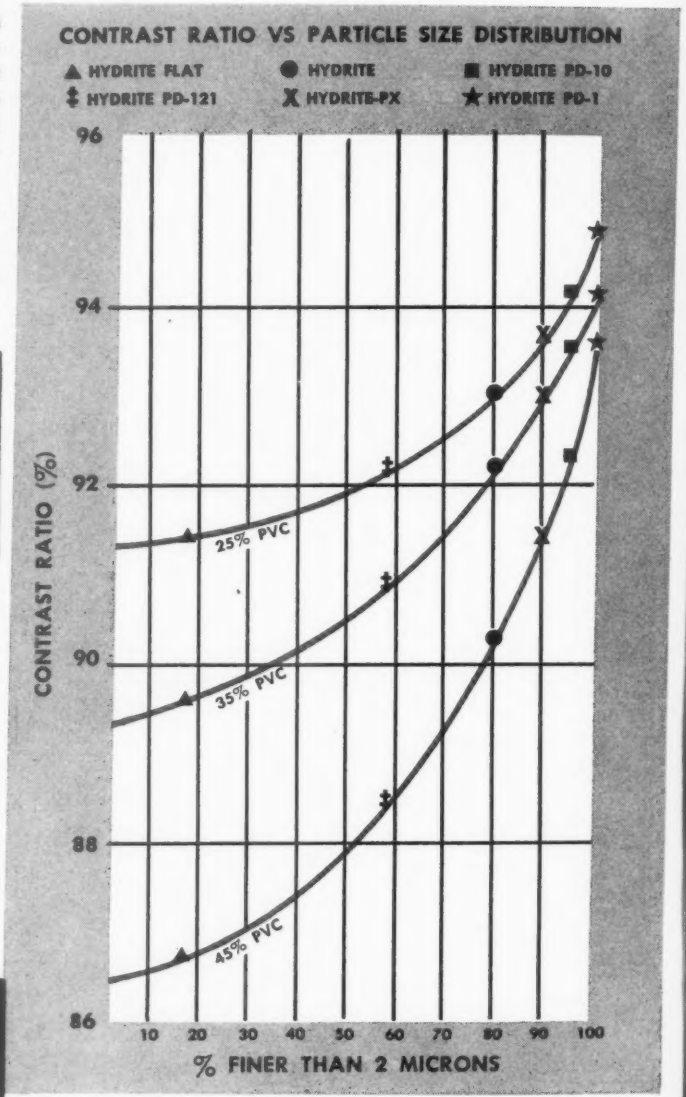


#6 in a series describing the effect of kaolinite particle size on important properties of various paint systems.



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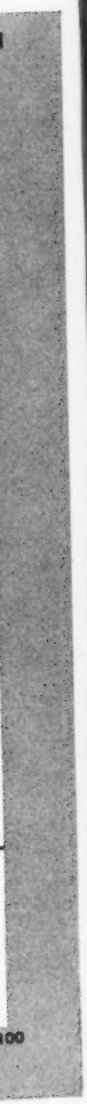

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